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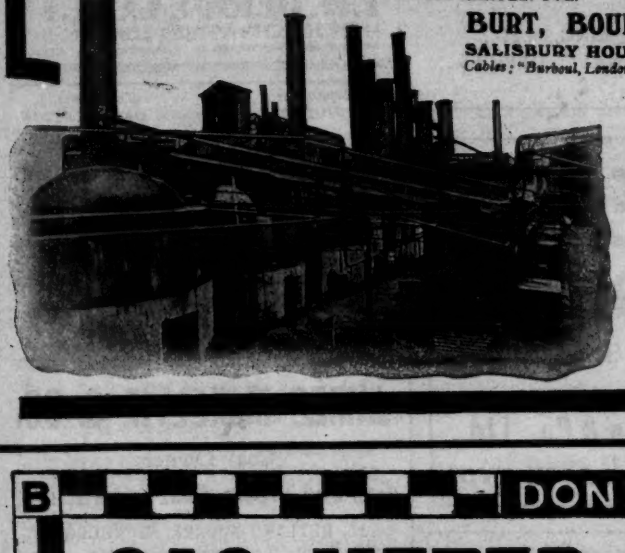

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VOL. CLXXI., No. 3245.] WEDNESDAY, JULY 22, 1925. [77TH YEAR.

EDITORIAL NOTES.

Approaching Retirement of Mr. Honey.

AT the end of August, the Director of Gas Administration (Mr. H. C. Honey) retires; and into the days of leisure he will carry with him the highest regard and the heartiest good wishes of the men of the gas industry. Both the Board of Trade and the industry were indeed fortunate in having him available when the Gas Regulation Act was passed in 1920. With that revolutionizing measure coming into operation, the heavy, responsible, and delicate work attending the change required someone who knew thoroughly the legislation of the industry, who was not a novice in investigating proposals for new statutory powers, and who was diplomatic. Such a man was Mr. Honey; for those of us whose duties carry them behind the scenes knew of his ripe experience and knowledge through work relating to Bills and Provisional Orders. Thus he became, rightly and fitly, the first Director of Gas Administration under the new Act. When that measure came into force, no one had any conception of the amount of work that would be entailed by translating statutory gas undertakings from the volumetric to the therm basis; no one anticipated the investigations that would be necessary in respect of various matters which have arisen from the Act; and then there were the inquiries where hostility was shown to Special Orders for which application was made under section 10. Conferences and interviews have also been innumerable. What is known as to the amount and intricacies of the work is more or less superficial and general, but the knowledge is sufficient to assure us that only patience, perseverance, and special qualification could have succeeded in accomplishing what has been done in the past five years.

Take the transfer from volumetric to the thermal basis. This was something altogether new; it was revolutionary. The addition to standard and maximum prices allowed by the Act had to be the subjects of individual and careful investigation, and many factors had to be applied in the process of coming to a decision as to what was fair to both undertakings and consumers. Then the time came when many of the first decisions had to be revised. The work was such that it could not be done in any perfunctory manner; and it could not be standardized in view of the fact that the conditions of no two undertakings are exactly alike. In the beginning, it was thought the work could be accomplished quickly; but what was believed in the days before there had been experience underwent a complete change as experience accrued. As progress was made, the men of the gas industry recognized that their indebtedness to the first Director of Gas Administration was rapidly accumulating. Of this there has from time to time been recognition; and it is emphasized to-day—leaving out of calculation all else—when we see there are in existence close upon 600 Orders under section 1, which have received individual consideration and treatment. There will be upwards of 800 when the remaining companies come in, and the larger number of outstanding local authorities join the ranks voluntarily or by compulsion. However, to-day the rough work has been done in connection with the change the Gas Regulation Act has effected, and the machinery is now running smoothly—thanks to the labours of Mr. Honey and his staff. The Director will leave the work at the end of next month in a position free from the heavy anxieties and difficulties which have been encountered during the last five years. By gas men the decisions of the Director have been accepted with great readiness and little complaint; for the feeling is universal that the difficult task has been conscientiously and competently performed.

The industry will part from Mr. Honey with great regret; for it has grown to regard him as the link between it and the Government Department responsible for giving effect to the provisions of the Gas Regulation Act. It is good in the circumstances to have one who has the confidence of both the Department and the industry. Whoever his successor may be, gas administrators and officials will desire nothing better than the same happy relations as have subsisted between them and the Director who is about to enter upon the enjoyment of well-earned leisure.

Intensive Culture.

WE are beginning to think that it is not a bad thing after all that successive Governments have been engaging themselves with the power problem, and have been directing their attentions—mistakenly—to electricity only, instead of considering the larger problem of national heat and power supply in relation to the conservation of coal and the co-ordination of the use of fuel supplies. The insistent way in which the one-line course has been pursued, combined with speeches which revealed ignorance of the subject, rumours as to intentions, and whisperings of "assistance" and subsidies to the electricity industry, have had a wholesome, stirring-up effect, and the gas industry has been moved to action in manner which might not otherwise have happened. The salutary result, we think it may be claimed, is that almost suddenly new light has penetrated to high places, and men who have political influence in these matters have learned that there is a wider and broader view of the subject which must not be ignored in the interests of the country. The educational work which opened with the Presidential Address to the Society of British Gas Industries, followed by the one at the National Gas Council, have done a vast amount of good in spreading enlightenment. As a consequence, we have also found among laymen interest in the subject; and excellent public opinion is being formed. Industrialists are especially keen over the matter; and it is seen that they have no wish for the Government to interfere with the provision of power for them. They are capable of taking care of themselves. They resent the idea of the Government "assisting" one industry out of money largely provided by other industries and trades, to the end that, if cheaper electricity did issue from the Government schemes, it would be at the expense of those who provide a greater amount of revenue for the National Exchequer. And the manufacturers of the country are now doubting very much whether the Government scheme, with its large amount of capital expenditure, and its extra costs and losses on distribution, would from the fraction of a penny saved on fuel costs make any difference other than on the wrong side to their power costs.

In this work of spreading intelligence on the subject, Mr. D. Milne Watson, the President of the National Gas Council, and Governor of the Gas Light and Coke Company, has been the protagonist. Apart from personal attributes, the favourable position he occupies for defending the gas industry against the erroneous boosting

by the Government of electricity, and for disseminating information on the subject, has been utilized vigorously during the past couple of months or more. This is called by some "propaganda." It is propaganda—educational and good industrially and nationally; and it is doing much to fill a previously neglected blank in the operations of the gas industry. It is being properly done—not only through the addresses previously referred to, but by getting into direct contact with people, and by bringing them into touch with the working of the industry. We should not be surprised to find that even the Government are beginning to realize that there is less substance in the benefits (if any) to be conferred by their electricity schemes than they had been led to believe; and there is certainty that, if they would only go far enough with their researches, they would find that there is a contra account which would altogether annul nationally and industrially the advantages they have pictured.

In this work the Board of the Gas Light and Coke Company have generously given their influential support to their Governor. For example, last Friday some 350 representatives of Chambers of Commerce of ten London boroughs visited the Beckton Gas-Works, and were shown the vast operations in gas production carried on there for the service of a large part of London, and in the working-up of chemicals from the secondary products of coal carbonization. We hazard the opinion that few of the visitors had any prior conception of the extent of the utility which is derived from coal through the processes to which the gas manufacturer submits it, and they know more now as to how essential the operations of the gas industry are not only to the provision of gas and coke, but to the supply of other industries and trades with materials which are absolute necessaries to their existence. If injury is done to the gas industry through the boosting of electricity by the Government, greater material harm would be done to employment in this country than the measure of chimerical good to it pictured by those who favour an electricity scheme by the Government. At the Beckton visit of the representatives of London Chambers of Commerce, Mr. Milne Watson alluded to these matters; and the Mayor of Islington (Mr. S. Harper) and the Secretary of the National Chamber of Commerce (Mr. Patrick Howling) expressed the hope that the Government would keep their hands off trade and industry, and devote attention to their real business and responsibilities—viz., reducing the great incubus of taxation. That is sound advice.

A Question of Supply and Demand.

THE report for the past session of the Livesey Professor at the University of Leeds (Prof. J. W. Cobb, C.B.E., B.Sc.), which was published in the "JOURNAL" last week, is unusually interesting. The whole document breathes of the evolution which marks progress in the range of activities of the Department and in the demands of industries upon its services and for its intellectual "products." Attention is especially arrested by the first paragraph, and by the list of appointments of graduates, because in them we have evidence on the one hand of the new and growing allurement to students of the fuel-using and metallurgical industries, and on the other of the expanding call for specially trained men for scientific work in those industries. The very first lines of the report are symptomatic of these developments, which are good not only for the industries concerned, but for the general economic conditions of the country. Prof. Cobb states that the year under review and the current session have been marked by entries of students who, having taken degrees in chemistry at Leeds or other Universities (Cambridge and London), went into the Department for post-graduate training in Fuel, with a view to taking the diploma, honours B.Sc. degree, or Ph.D. in Gas Engineering. This manifests the existence of an enlarging desire to specialize in fuel; and of this we are confident, that fuel is going to have a greater place in professional work than ever it has had. Notwithstanding that fuel is a basic and universal need, it is one of the last things to become the subject of scientific care with a view to its economical and efficient utilization; but this condition is being gradually altered in many directions—notably by the work at Leeds University.

It is also interesting to learn that among the newcomers to the Department is a woman student—the first—who is studying more particularly domestic fires and gas appliances, in order to qualify herself for professional work in that connection. Already there is great indebtedness to one woman scientist in this field—Dr. Margaret Fishenden—and hearty welcome is given to the new recruit who is specializing in appliances for the utilization of gas. The combination of science with domestic requirements is a quarter of our work in which qualified women may be able to render invaluable service to the gas industry. There has lately been brought into existence an Association of Electrical Women, the work of the members of which is directed to the development of the household appliances of the much-handicapped rival to our primary product. Some of the lady members of the Association have, if not a deep scientific understanding of the subjects they handle, a very fair technical knowledge of the applications of electricity. Only the other day we saw how one of them had in a paper made some very practical suggestions regarding domestic electrical equipment with the view to greater domestic safety and convenience. Men are not such believers in the completeness and finish of their own work that they cannot learn anything which will help to greater perfection from women competent to co-ordinate in their own realm the teachings of science with the requirements of daily life.

Another point is that of the supply of, and the demand for, qualified men. Prof. Cobb tells us, through his report, that as regards special students and research workers the Department is developing satisfactorily; but there is still a want of steadiness in the supply of students for the normal three or four years' course of training in the University leading to a degree or diploma. That is unsatisfactory. We can imagine Prof. Cobb's feelings when he had to pen the words: "We have not been able to meet "the demands made upon us for really good fully-trained "men, because of insufficient entries." We commend those words to serious consideration. They are important; and they should be noted by parents and young men who, with a bent in the direction of work of this kind, are hesitating regarding a career. It should at the same time be remembered that, the more scientific training attracts the administrators of industry, the more that form of training will be in the ascendant as a consideration in the filling of appointments; and as that consideration progresses, so the old order of things in regard to selection for position will recede. Prof. Cobb enlarges upon the question of supply and demand; and these passages of the report should also claim attention: "The "demand itself is gratifying—particularly since it comes "mainly from quarters where our graduates have found "openings previously, and have presumably justified their "selection. But we have not yet attained the ideal of a "steady supply of students on which we can count "from year to year, and a correspondingly steady demand "from the gas industry and other industries depending "upon the scientific handling of fuel for their develop-"ment." We turn to the appointments of graduates during the year. There were sixteen of them; and, including two who secured appointments at a gas-plant works, the gas industry absorbed a dozen of the graduates. Probably that is not many in a twelvemonth for such a large industry; but it is 75 p.ct. of the whole number of appointments. Prof. Cobb is not complaining. His desire is to impress upon all concerned that what he would like to see is not so much a large number of students as "steadiness" in their supply for the normal three or four years' course of training; and a corresponding "steadiness" in the demand for the men by the gas and other fuel using industries. He may never get to his ideal in this matter; but we hope that all who have influence will do their part to enable him to do so as nearly as possible.

There is much else in the report of interest as to the development of the work of the Department, and the stretching-out of its usefulness; but these several points must be left to a perusal of the report itself. Among them are two paragraphs referring to the Sir Corbet Woodall memorial experimental plant, which has widened considerably the facilities for excellent work by the Department in research and instruction.

Two-Part Charges for Gas.

As our records show, two-part tariffs for gas are not unknown in this country; but this week interest in the matter of following our electrical friends in this respect is directed to a discussion of the subject by those executively responsible for gas supply in Sweden. This took place at the annual meeting of the Swedish Gas-Works Association, and was introduced in a thoughtful paper (which analyzed the situation and the considerations affecting the charging for gas on a bi-part tariff in lieu of a flat rate) by the President (Mr. Ragnar Blomquist, Chief Engineer of the Stockholm Gas-Works) and the Vice-President (Mr. H. M. Molin, General Manager of the Malmö Gas and Electricity Works). Our thanks are due to Mr. Blomquist for giving us the opportunity to present to British Gas Engineers and Managers the views of their colleagues who are operating in such circumstances as the chief officers of Swedish gas undertakings. Their conditions may be taken as about the most unfavourable which could attend a gas-supply industry, and yet, despite that fact, the undertakings are not only able to pay their way, but to hand over something substantial in aid of the rates. But like wise men the responsible officials are looking forward, and taking action now to improve and consolidate their position in the future, which would not occur by pursuing a *laissez-faire* policy.

What are the conditions in Sweden? Nearly all the gas and electricity works are municipally owned, electricity is largely generated by water power, and it is with this the gas undertakings have to compete. The indoor lighting and a large part of the public lighting have gone over to electricity, as has also the power load. But, notwithstanding the relative cheapness of electricity, and the hitherto high price of gas—wrongly maintained at a high level in order to provide aid for the rates—as well as the competition for heating of coal, wood, and liquid fuels, the gas-works have obtained important domestic cooking and heating and industrial heating loads. It is, however, conceivable that in these circumstances the diversity of domestic consumption, even in the same social classification of consumers, would have a large range from the individual minimum to the individual maximum. This being so, it is contended that the flat rate system of charging for gas does not do justice either as between the consumers or to the undertaking—in fact, some of the former are a dead-loss to the undertaking, and, financially considered, they could be well dispensed with under the rule of a flat price per therm. But is there no way in which they could be made profitable to, instead of a burden upon, an undertaking, and which at the same time would confer advantage upon the consumers whose business is more lucrative to the undertaking, and give them an inducement to enlarge their patronage? Messrs. Blomquist and Molin find the affirmative answer in the two-part tariff—in the application of a fixed annual rate which shall apply to all consumers alike whatever the measure of their custom, and in a lower charge per therm than would be possible by a flat rate in current circumstances, which lower charge would act as a stimulant to increased consumption. The movement in this country is towards differential prices for different applications of gas; but this necessitates duplicate piping and meters. It is through this that a two-part tariff has a recommending force. But, on the other hand, a two-part tariff in this country—well spoken of where it has been tried for gas, as at Halifax—is not universally approved by electricity consumers. The smaller consumers, who prefer the economies and the greater utility of gas for cooking and heating purposes, object to the lump sum charge, and prefer to pay a flat rate for exactly what they use. Of course, these are the consumers who, averaging out the fixed charge with the charge per unit, gain no advantage from the two-part tariff, and are not tempted by it to increase their patronage in order to secure a lower average cost per KW.-H. Yet they are the consumers whom the electricity purveyors want to induce by the two-part system to increase their patronage, but who, preferring gas for cooking and heating, decline the bait.

In their paper, Messrs. Blomquist and Molin discuss the considerations which should apply in ascertaining the fixed charge and the subsequent price per therm; but actually both the fixed charge and the price per therm will differ as between undertakings. By way of illustration, they take 14s. per annum as the fixed rate which all consumers must pay in a concern in which the average annual consumption per consumer is 72 therms, with a subsequent charge per therm of 9d. This means that the fixed charge and the 72 therms would average 11·3d. per therm, while all consumption over this rate would be at the 9d. A 20 p.ct. reduction per therm to the large consumer after 72 therms is an important and seductive consideration; and important also is the assurance that every consumer pays his share of the fixed charges. The question arises as to how the fixed charges are to be calculated. Several factors apply; and there is discussion of them in the paper. The Swedish Association, as a result of the paper and discussion, passed a resolution that, as a principle, gas tariffs should be based on the costs for production and distribution, and consequently they should consist of a fixed rate per consumer and a special price for the consumption. We shall be interested in watching the development of this change in Sweden. The Association having adopted a two-part tariff as a correct principle for application in these times and in their circumstances, their next step should be to place the matter on a firm basis by determining the formulæ for calculating on the one hand the fixed charge and on the other the price per therm.

At the moment the gas business in this country is progressing favourably; but there are demands in some directions—for instance, in the gas-power business—for much lower prices if there is to be full development. We have to look forward rather than to the past or the present. Looking forward, there may have to be much greater liberty in respect of gas prices than at the present time. That greater liberty would involve legislative changes in respect of discounts and so forth, and it may be that the sliding-scale will have to be regarded as a stumbling-block to competitive price requirements. Respecting this, "Oikonomia" had something to say in our "Correspondence" columns last week. One of the strange things about the gas industry is that while changes proceed all around it, while changes occur in its own internal system, these go on without consideration of whether correlated matters also need deliberate change. The question of how the sliding-scale is affected by present conditions and demands and prospectively anticipated competitive conditions has never been thoroughly explored. The South Metropolitan Company changed from the old form of sliding-scale to a basic dividend and price for the protection of their capital. But that alteration, as in the case of other companies who have acted through their leading, has given them greater latitude in respect of the gas business than was probably dreamed of at the time of the conception of the change.

The Rule of Ignorance.

THE crisis in the mining industry was made even more acute last week by the uncompromising refusal, at the Scarborough Conference of the Miners' Federation, to take part in the Court of Inquiry which has been set up by the Government, and which met on Friday to begin its work of investigation, but unfortunately without one of the parties present. Whether deliberately or otherwise is not known, but the Miners' Federation distinctly misunderstands the object of the inquiry. According to a resolution passed at Scarborough, and a letter received by the Court of Inquiry from the Secretary (Mr. A. J. Cook), the Federation believe that the terms of the reference and the constitution of the Court are "obviously designed to justify the present attack on the miners' standard of living, and in respect of which it [the Federation] was in no wise consulted." The Government did not consult anyone in the matter. Both the constitution of the Court and the reference were intentionally of an order to secure an independent investigation into the causes of the dispute, and (as Mr. H. P. Macmillan, K.C., the Chairman, put it) in the hope that the Court might be able at this serious time to perform an office of value to both parties concerned and to the public. The first step towards a solution in controversies of this kind is the accurate ascertainment and the elucidation of the points on which the parties are at variance and of the relevant facts of the situation. The Court sent a formal invitation to the Federation to

be represented at the sitting on Monday; and intimation was given that, whether or not they attended, the Court would proceed with the inquiry. There was no appearance on behalf of the men, and so the investigation began. The communication from the Federation indicates not only misconception but suspicion. It also suggests that they do not want independent investigation by men who are disinterested other than from the point of view of rendering good service to the industry and to the country. The Executive of the Federation endeavour to shield themselves behind the assertion that there have been previous inquiries, and that they are sufficient. This ignores the fact that within a comparatively brief space of time there has been a complete metamorphosis of the economic circumstances of the industry, and that the change is likely to be permanent.

It is from the plane of to-day's conditions that matters have to be examined, with an eye upon the probable conditions of the future. Only from that plane can determination be made as to whether terms fashioned in the past can be continued, or whether they will require to be remodelled in order to make them conform with and fit the economic circumstances of to-day. It is simply tomfoolery to ignore the truth that a new and unalterable state cannot always be met by conditions framed under quite another order of things. Nor can they be made to harmonize by any amount of trade union alliances in this country or international agreements between miners. Even if they could, history has shown that there cannot be such a synthesis between trade unions that their interests can all be made to accord, and that they can move as a single body, on every occasion; and, as to international agreements, the Miners' Federation obviously must have a great belief in the brotherhood supposed to be engendered by similar occupation if they think that that relationship is going to sweep aside love of country and consideration for its interests. The men in the anthracite fields of the United States who are threatening to strike just now are doing so in connection with their own interests—not those of British miners. The coal fields of Germany, Belgium, and France are working at full swing, and have captured the markets. The stranglehold is being applied properly to the British mining industry and its men, notwithstanding the talk by Messrs. Cook & Co. of an international upheaval in the mining world, and the co-ordination of labour conditions. The miners in other countries are in full-time work, because their product is being supplied at considerably less cost than our own. Employment is good in their countries; and trade union tactics in this—particularly the tactics of the Miners' Federation—it is devoutly desired by the people of other countries shall continue, for they are reaping while unintelligence in this country is destroying. What is being done here is all directed to the Communistic longing for nationalization; but realization of this could not improve the economic state of the coal industry. There are others, too, who would like to see subversive opportunities furthered by the ordering of strikes in the coal industry being placed in the hands of a few men, without having a ballot vote with the necessary two-thirds majority as is now required. In this particular fortunately the extremists cannot get their way.

However, the Court of Inquiry will proceed with their work; and Mr. Bridgeman is continuing his efforts to bring about a resumption of negotiations between the representatives of the Mining Association and the Miners' Federation. The latter now do not make it a condition precedent that the owners shall withdraw the notice to terminate the present agreement, but they still refuse to meet the owners with their wage proposals on the table—notwithstanding that these are not demands, but are there for consideration, just as would be suggestions from the Federation—in fact, the Mining Association have expressed willingness to discuss any proposals from them. Really the essential difference between the two sides is not great to-day; the greatest difference is due to the obstinacy of the Federation to understand the necessities of the situation. They are both agreed that the industry is in a disastrous condition. They both want it to yield more; the point is, How? The Miners' Federation refuse to be constructive; but they want more from a source where it does not at present exist. They will not co-ordinate, on the lines of former standards, employment with coal demand. They will not recognize any co-ordination of the terms of work with economic conditions. In short, they want some miracle to be performed which will give them what they want without affecting their prescriptions; but not even an alliance with other powerful trade unions can bring this to pass. It would be a good thing for the miners and for the country if the representatives of the former would concentrate on basic facts, and not on visions. Regarding the point as to the co-ordination of employment to coal demand, according to the "Iron and Coal Trades Review," in 1899 the annual output per person was 314 tons. In 1907 it only required 932,104 persons to produce 267 million tons, or the same quantity as was raised in 1924 at the hands of 1,230,000 workers! It is high time that more sense permeated the counsels and doings of the Miners' Federation.

Coal Position and Current Demand.

It is reported that a considerable number of miners who were previously unemployed have again secured work through their absorption by collieries who are operating to full capacity in order to cope with the sudden extraordinary demands for coal. It is stated that in some districts the stocks of coal have been cleared from collieries, which include the accumulations of months. Of course, this demand is abnormal for stocking purposes, in view of the existing uncertainty.

Special Order Procedure.

It will be remembered that in June, 1924, a Select Committee of the House of Lords was appointed to consider this question. The idea seemed to prevail in some quarters of our Legislature that, through the existing procedure in connection with Special Orders, Parliament was losing control over the granting of new powers to statutory undertakings; and it was thought that that control should be preserved. For many years promoters of Private Bills have complained of the excessive cost and protracted nature of the procedure; and the method of securing powers by Special Order greatly alleviated those conditions, particularly in the case of small undertakings. The Central Executive Board of the National Gas Council saw that an attempt should be made to obtain adherence to the present simplified form of securing additional powers by Special Order. They therefore asked to be allowed to give evidence before the Select Committee; but the Committee decided to consider only written communications. In view of this, a memorandum was prepared by the Central Executive Board, which submitted that the existing procedure as outlined in section 10, sub-section 4, of the Gas Regulation Act had been of immeasurable value in enabling the smaller gas undertakings to bring their Private Acts up to date in an inexpensive and expeditious manner, and that any alteration of this procedure might be a very serious matter especially for such concerns.

The Recommendations.

The Select Committee have partially—but insufficiently—attempted to meet the objections of such industries as that of gas supply against any interference with the Special Order procedure. They recommend that a Standing Committee should be set up, to be known as the Special Orders Committee. The functions of this body would be, in the first place, to consider Orders as soon as they were laid upon the table of the House. Then, if no petition was presented against an Order, the Special Committee would report to the House. Should, however, a petition be presented, then the Committee would examine the Order, and consider it from certain points of view. Primarily they would examine the Order to ascertain whether the private rights affected were of a substantial character. Next as to whether the matter had been adequately dealt with at the departmental inquiry. Also whether the submissions in the petition could have been introduced at the local inquiry, but were not. All these questions, including the findings at the inquiry, as well as any other circumstances, would then be taken into consideration to ascertain whether or not there should be further inquiry. It can readily be seen that these recommendations of the Committee would have a retarding

effect upon the course of a Special Order; and therefore the efficiency of the procedure in respect of both time and cost would be adversely affected. It is also clear that the way would be open to frivolous objections being made by opponents before the Standing Committee. At the moment, it is difficult to see what further steps can be taken in defence of present Special Order procedure; but it is learned from the minutes of the Central Executive Board that the Associations representing gas, water, and electricity interests are taking steps with regard to the matter. The nature of these steps, however, has not yet been divulged. Apparently the Special Orders Committee have been appointed, seeing that for the first time in the minutes of the House of Lords last Wednesday, intimation was made that the drafts of four Special Gas Orders had been referred to the Committee.

Sir Arthur Duckham on the Mining Crisis.

The Presidential Address of Sir Arthur Duckham to the Institution of Chemical Engineers' meeting in Leeds last week, was in part devoted to the crisis in the mining industry. In the course of it, he gave some very sound advice to both of the parties concerned, as well as to the Government. His opinion coincides with that of most people, that the cure for the present conditions of the industry lies within the industry itself; and he advocates the fullest measure of co-operation—co-operation in the individual mine or group of mines—and agreement for securing more economical working. Given freedom of action with proper safeguards, he feels certain that satisfactory arrangements for pay, working hours, and the operation of the pits would rapidly follow; but the first necessity is that of inducing confidence between the owners and the men. That is an ideal which no doubt the owners would very much like to achieve; but the difficulty is that between the owners and the men there are leaders of the latter who have tremendous influence, but who, far from desiring to assist in developing such confidence, prefer to keep the division as wide as possible. It will be seen that Sir Arthur also holds that it is a great mistake for politicians to be talking of subsidies for this and that. He does not know, in fact, how the Government can afford to talk of subsidies when taxation is the greatest burden of industry to-day. Coal, however, forming the country's basic industry, he thinks that the Government might perhaps facilitate improvements in the development of the industry by financial advances on sound lines; and this would, in his view, be the quickest way to help prosperity back to the country. He believes that colliery owners, if they could be assisted by the Government to obtain money at a reasonable rate, would develop their mines, and in this way bring about a lowering of the price of coal. A proper development of coal-cleaning at the pithead could also be helped by Government money—not given, but lent; and the whole country would immediately receive material benefit.

Subsidy for Domestic Coke.

In Canada an innovation is being made with the object of encouraging for domestic purposes the production of coke as a substitute for anthracite. The Canadian House of Commons have taken this matter under their wing. According to the "Iron and Coal Trades Review," a resolution has been submitted to the House which provides that the Government shall pay to any company who will enter into an agreement to construct works for the production of domestic coke from coal mined in Canada, an annual sum not exceeding 3 p.ct. of the cost of the works during a period not exceeding fifteen years. By the agreement, the company would be bound to use in the manufacture of coke only coal mined in Canada; and in the event of other coal being employed, the company would have to pay a penalty, as liquidated damages, of $1 per ton of coke produced from coal other than Canadian. Another stipulation is that the coke produced in works constructed under the proposed legislation must be sold at fair and reasonable prices; and the prices will be submitted to control by the Dominion Fuel Board, or by such other authority as the Governor in Council may determine. The works would also have to be maintained and operated for the production of domestic coke within the limits of their capacity in such manner as to meet the reasonable requirements of the public.

The Fire and the Light.

The beautiful mansion, Ballard Coombe, Kingston Hill, sustained damage by fire to the extent of between £20,000 and £30,000, early last Wednesday morning. A maid thought she could smell burning, jumped out of bed, and tried to switch on the light, which failed to act. The alarm was given; but within a quarter of an hour the roof was well alight. It is "supposed" that the fire was caused by a short circuit. From the evidence, we should say that the supposition was not far wrong.

Summer Time Bill.

This Bill passed through its final stages in the House of Commons last Friday—chiefly owing to a compromise being effected between the supporters and the antagonists. The upshot is that the commencing date of permanent summer time will be the third Saturday in April, and the terminating day the first Saturday in October—the date named in the measure. The Bill has now to come before the House of Lords.

Coal and the Production of Steel.

A very interesting statement was recently made by Sir Frederick Mills, Bart., when addressing the shareholders of the Ebbw Vale Steel, Iron, and Coal Company, Ltd., regarding the chief reason for the comparatively high cost of British iron and steel. He attributed this to the price of coal. From the data he gave, it is seen that the cost of coal in a ton of steel is as much as from 25 to 50 p.ct. according to the locality. In view of this, it is perfectly apparent that without cheaper coal the advantage in the iron and steel trades must lie with our competitors abroad. While steel prices are only some 30 p.ct. above pre-war level, metallurgical coke is up some 75 p.ct. or 80 p.ct. above pre-war. This shows that—notwithstanding the reasonable introduction or extension of the eight-hour working day in iron and steel works—considerable improvements in the technical and mechanical efficiency of the plants must have been effected, otherwise the iron and steel industry would already have been out of the race.

New Labour Alliance.

The project for a new labour alliance was advanced another stage last Friday. The Committee who have been considering the matter in relation to the existing constitution, rules, &c., of the various unions have drafted a constitution which, in their opinion, provides for a "workable alliance." This constitution received on Friday the consideration of the executive representatives of the Miners' Federation, Transport Workers' Union, Transport Workers' Federation, Iron and Steel Confederation, Amalgamated Engineering Union, Engineering and Shipbuilding Federation, Electrical Trades Union, Moulders' Society, National Union of Railwaymen, Railway Clerks' Association, Associated Society of Locomotive Engineers and Firemen, and Boilermakers' Union. The following resolution was passed: "That this conference, having heard the report of the Committee appointed by the St. Pancras Conference, setting forth the constitution of the Industrial Alliance, with all its implications, recommends the executives immediately to give it consideration, and to consult their constituents, and to report to a further conference to be called in a reasonable time." The question of whether the draft really provides for a "workable alliance" has yet to be answered.

PERSONAL.

Mr. F. R. WESTON, B.Sc., who was appointed the first holder of the Gas Light and Coke Company's Post-Graduate Research Fellowship, inaugurated in connection with the Department of Technology at the Imperial College of Science and Technology, and who has held the Fellowship for the past two years, has been re-appointed for a third year, commencing on Oct. 1 next.

The Lighting Committee of the Swadlincote Urban District Council have reviewed the question of the management of the gas-works, and have decided to recommend that Mr. C. H. TAYLOR, at present temporary Manager and Engineer, be appointed to the position, as from Aug. 1 next.

Miss IRIS D. FREE, elder daughter of the Secretary to the Windsor Royal Gaslight Company, has obtained her B.A. Degree (Honours English Language and Literature) at Oxford University, St. Hugh's College.

ELECTRICITY SUPPLY MEMORANDA.

Public Lighting.

DURING recent years lighting authorities have had their difficulties augmented to a very considerable extent through fast moving traffic in the streets. There is one point which is overlooked; and it is that this new form of traffic is not confined to main streets in urban districts, but extends to the country beyond, and there from the illumination point of view inefficiency prevails. This, in other words, was pointed out by Mr. Haydn T. Harrison, in a paper which he read on "Modern Street Lighting," before the Incorporated Municipal Electrical Association at their recent annual convention at Brighton. Statistics prove that, due in a great measure to vehicular traffic, the number of street accidents at night has increased rapidly; and some of these—and terrible ones too—have occurred away from the most populous areas. But, of course, one cannot in the country districts spend on lighting in anything like the same proportion as in the more densely populated cities and towns. Mr. Harrison says that the fact that motor vehicles have to provide their own lighting, and policemen have to use lanterns to detect vagrants and criminals, goes to prove that the intensity of illumination has not advanced sufficiently to meet modern requirements. We cannot say that motor headlights and the policeman's lamp are suitable proofs of this. The fact is that one cannot run adequate night lighting in all the outer areas at an intensity sufficient to supply the illumination required by motor vehicles; and therefore these vehicles have to provide their own headlights, which is a far cheaper process of obtaining illumination with a view to avoiding accidents. The same with policemen. It would be impossible to provide general illumination in the streets which would light-up the bordering gardens and all the nooks and crannies found in residential areas, and therefore the portable light carried by the policeman is advantageous, and a saving to the local lighting authority. At the same time, we quite agree with Mr. Harrison that the increase in the outlay on public lighting has not—having in view the higher illumination to be obtained for a given expenditure—been commensurate with the development of requirement. The author has been investigating the sums allotted to public lighting by the county boroughs, metropolitan boroughs, provincial boroughs, and urban districts; and this has extended to over 100 examples, typical of all classes of municipal conditions. The result of this investigation is that it proves: (1) That the average rate allotted to public lighting is 5·3d.; (2) that this represents only 3·36 p.ct. of the total rates levied; (3) that the rate varies from 1½d. to 10d., but is generally between 3d. and 5d.; (4) that it is not materially affected by the use of gas or electricity or the combination of the two; (5) that the two smallest rates are in the Metropolitan boroughs—the lowest being 1½d., which is electric lighting throughout, the other 1¾d. where the electricity and gas have divided the street lighting nearly equally between them. It is also interesting to know that the lowest rate existing is in a borough which is considered to be one of the best lighted districts; and it includes an important thoroughfare which is, according to the author, an example of the best practice of street lighting in the country. Of course, we know that in some municipally supplied electricity areas, extraordinarily low prices per unit are charged for public lighting in order to attempt to justify conversions from gas. However, the main point is whether the increasing importance of street lighting does not warrant a larger expenditure. We quite agree that it does; but we know of many districts in which the gas lighting could be modernized at an outlay which would be modest in comparison with conversions to electricity.

Illumination Requirements.

Mr. Harrison proceeded to deal with illumination requirements, and grading and classification of streets. In his opinion, both for police and traffic considerations, the minimum illumination of the lowest grade street should be 0·025 foot-candle. As regards the higher class street, he sees no object in fixing a limit. Another point is that hitherto only the illumination of roads and footways has been considered. That, we suppose, was before the days of cat burglars, seeing that the police now point out that the protection of property requires illumination on doors and windows; and in streets bordered by high buildings, shops, &c., it is often desirable to illuminate the frontages as high as possible. In the author's judgment, the following illumination standards are the least at which to aim.

Class of Street.	Minimum Horizontal Illum. Ft.-Cand.
Grade A.—Residential Roads (Slow Traffic)	0·01
,, B.—Residential Districts, with By-Pass Traffic .	0·025–0·05
,, C.— ,, ,, with Intermediate Traffic	0·05 –0·1
,, D.—Main Traffic Streets of all Classes	0·10 upwards

Visibility and glare are also dealt with. Available data go to prove that glare exists when visible light sources are more than 200 times as bright as their background. Dealing with this matter permitted the author to draw attention to his directive system of illumination. There is no question that more attention will have to be given to the importance of scientific reflection in connection with street lighting, in view of the considerable advantage to be gained by it in respect of economy and quality and effectiveness of illumination. The author says he has found in practice that if a light source of sufficiently small power and brilliancy is chosen, and its power is increased by providing numerous independently reflected images of the same source, there is no effect or complaint of glare. An obvious suggestion is that lighting visibility is best obtained by providing sufficient illumination at all parts of the street, and reducing the effect of glare by erecting the light sources as high as possible or arranging a group or its equivalent of low-power units. He also advocates that, where sufficient illumination cannot be provided for financial reasons, to produce adequate visibility by direct light, the contour of objects or obstructions in the road should be accentuated by providing strong contrasts of light and shadow. There is nothing in these recommendations to which serious objection can be taken.

Comparative Statistics.

There is one section of the paper which gives the results of a collection of statistics as to the proportions of public lighting by gas and electricity from over 100 county and metropolitan boroughs and urban districts, where municipal electricity undertakings exist; and the figures, when analyzed, give some idea of the present state of affairs in the face of competition. Where there is no competition, and municipal authorities are necessarily forced to take the only illuminant available, the conditions are described as often deplorable. That is what Mr. Harrison says; and we are bound to admit that it is true. Yet there is no excuse for such conditions, for by a little expenditure on modernization a wonderful transformation can be effected. The statistics are, of course, not so valuable as they would have been had the areas from which they were obtained not been limited, but had been completely representative of the country. The data refer to all classes of streets and roads, and to 5675 miles lighted by 190,000 gas-lamps and 2092 miles lighted by 70,600 electric lamps. It will thus be seen that even in places where municipal electrical undertakings exist, over 70 p.ct. of the street lighting is still carried out by gas. In the case of the electrically lighted streets, the lamps are at an average distance of 29 to the mile, or 180 ft. apart, whereas the gas lamps are 34 to the mile, or 155 ft. apart. As Mr. Harrison says, this is no doubt accounted for by the practice of largely increasing the spacing when introducing high-power electric lamps. In this case, the author concedes, the average result of using electric lamps with reflector fittings so often found in practice would not be a noticeable improvement on the original gas lighting. It may be taken therefore that the present conditions which exist in 90 p.ct. of the streets lighted by gas or electricity is the use of 50 to 100 c.p. lamps mounted 10 to 12 ft. high, spaced at 150 ft. or over, which would result in a minimum horizontal illumination of from less than 0·0015 to 0·003 foot-candle—a condition very little better than beacon lighting, and certainly one which would not prove safe with modern motor car traffic, excepting when powerful headlights are used. Such a condition, it is pointed out, emphasizes the importance of an immediate remedy being made by local authorities.

Lamp Efficiencies.

There is one thing we cannot deny to electricians, and that is full credit for inventiveness in respect of charges for current calculated on most grotesque bases. A correspondent of the "Electrical Review"—"W. H. R."—says that consumers do not understand the lighting value of a unit or 1 KW.-H. We do not suppose they do; and "W.H.R." obviously shares in the ignorance. He sugests that it would be better, instead of speaking of a "unit" or KW.-H., to say 2000-candle-power-hours. He asserts that consumers will obtain that from the expenditure of a unit of current, provided efficient "half-watt" lamps are used. He thinks consumers would be more satisfied if they bought light in this way than energy in the conventional way. We doubt it. In the first place, where are they to get "half-watt" lamps? There are no such things on the market. The Editors of the "Review" know this; and they do not encourage their correspondent. They point out that an objection to his suggestion is that the candle-power-hours vary with the size of lamp. Only the largest gasfilled lamps approach the value stated; and "overstatement is highly undesirable." We agree. "Megohm" in the "Electrical Times" recently dealt with this question. He says the name "half-watt" should never have been given to the gasfilled lamp; for even a 1500-watt lamp has only an efficiency of about 0·75 watt per mean spherical candle power; and the 200-volt 40-watt gasfilled lamp is only rated at 24 mean spherical candle power—that is, 1·67 watts per candle. With the tolerances allowed in the lamp specification, this lamp may have an actual candle power (even when new) of anything between 19 and 29. The 40-watt vacuum lamp is rated at 28-candle power; and the tolerances allow 24-candle power minimum, and 31-candle power maximum. In other words, "Megohm" points out that the gasfilled lamp of this wattage actually gives less light than the vacuum lamp, according to the makers' own rating. He also says something else which

is confirmatory of experience. It is that the life of the gas-filled lamp is far less, at any rate when subjected to the ordinary supply voltage variations. "The only advantage it possesses is its horizontal filament, with the higher intrinsic brilliancy, which gives the effect of more light and better illumination on the horizontal plane." "Megohm" says much more on the subject. For example, the 200-volt 60-watt gas-filled lamp has a rated mean spherical candle power of 44, which is exactly the same as that of the vacuum lamp of the same wattage. But in practice the 60-watt gasfilled lamp, the writer asserts, gives a better light, and is more efficient than the vacuum one of the same size.

Wiring Dwellings. Those who ask for tenders for electric wiring, and issue specifications as to their requirements, must frequently wonder why it is that there are such remarkable differences between the amounts submitted by the tenderers. Judging by the numbers of tenders submitted, many would like to do the work; judging by the variations of the quotations made, they have greatly differing notions as to the amount of profit they deserve for their condescension in doing the work. The London County Council recently sought tenders for the wiring and fitting for lighting of the first five blocks of tenements on the East-hill Estate, Wandsworth. They received seventeen tenders—the lowest being £1656 and the highest £4174. The tenders ascended in quite an orderly manner from the lowest to the highest. The engineer's estimate was £1898; and there were only five of the tenders below that sum. It would be a matter of interest to learn as to the factors which are thought to justify the difference of 152 p.ct. between the lowest and the highest prices in this instance.

Factory Accidents and Fatalities. In the report of the Senior Electrical Inspector of Factories and Workshops for 1924 (Mr. G. Scott Ram), he refers to the rapidly increasing use of electricity for power. This does not confirm the idea that when manufacturers find that electricity is the preferable form of power for their particular operations, they are slow to adopt it. Reading the report, one is struck by the fact that users are largely to blame for the indifferent installation that is found in works and factories owing to the employment of incompetent contractors rather than highly skilled ones. As an example, in one report we read: "While a distinct improvement is noticeable in the quality of work in factory installations generally, there are other recent installations which demonstrate a deplorable lack of engineering knowledge and of the requirements of the regulations." Regarding the statistics as to electrical accidents, the number reported during the year was 433, including 27 fatal cases, compared with 361 and 21 fatal cases in 1923. Yet the basis on which the accidents are reportable is not quite the same for the two years, as there is now required a disablement of more than three days, as against more than one day only in 1923. This would tend to reduce the number of reportable accidents; nevertheless they have increased. A remarkable fact is that many persons every year meet with severe accidents from shock at very high pressures and survive, although in some cases with permanent injuries. Out of 37 accidents on high-pressure or extra high-pressure systems, only 6 were fatal. In the use of portable apparatus, there were 72 accidents—all at low pressure. In 48, or two-thirds of them, the injuries were burns from short-circuits, and in the other 24, including 5 fatal cases, the injuries were from shock. Half of this class were due to the use of poor quality or worn-out flexible. Twenty were due to the use of old type—not hand-shield—connector plugs, or to the use of adapters in lampholders. A dozen occurred at electric-irons, due to short-circuit at the point where the wires leave the iron close to the operator's hand. Of the fatal cases, one was due to the employment of an unearthed metal connector for a portable lamp in a brickyard; another to the use of a damaged flexible, and another to a badly-made joint in a flexible. One was ascribed to that handy makeshift for the purpose of a portable lamp—an ordinary metal lampholder unearthed, and another to an old-type partly metal handlamp unearthed. Thirty-six accidents—one fatal—occurred in the testing departments of electrical manufacturing works. Twenty accidents—three fatal—were met with in connection with electric cranes. Twelve accidents—four fatal—were due to non-earthing of metal work, other than portable apparatus. Inadequate protection of cables and wires in factories accounted for four fatalities. The major part of the fatalities occurred on alternating current circuits, where the pressure to earth or the pressure of shock did not exceed low pressure. It is seen there were 17 such fatalities at low pressure. In these seventeen cases, the probable voltage of shock was: In six, 250 volts; in five, 230; in three, 220; in three, 200. These are common voltages. Be it remembered that the statistics only refer to factories and workshops.

Fatality in a Palace. The preceding paragraph shows a number of fatalities in factories and workshops at ordinary voltages—between 200 and 250. Before us is an account of an inquest held on an employee of the Office of Works, who was electrocuted while engaged, on a recent Monday, at Hampton Court Palace. He was repairing a six-light fitting in the dining-room, and had actually got the lights going when a resident suggested that the lamps should be changed. While doing this in some way he received a shock, and fell to the floor. Artificial respiration was applied until medical assistance arrived; but this was of no avail. The electrical evidence showed that the actual voltage was 248, and that the insulation was in perfect condition. The only explanation that could be suggested by the electrical witness was that the deceased may have put his finger into the lampholder, and so received the shock. He knew of no other way in which it could have happened.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

July 23.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at No. 28, Grosvenor Gardens, S.W. 1, at 2.30.

July 25.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Visit of members and their ladies to Lytham-St. Annes. During the morning the members will inspect the new gas-works at Eastham.

Sept. 8.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board.

Sept. 14-16.—INSTITUTION OF PUBLIC LIGHTING ENGINEERS.—Second annual meeting and conference at Leeds.

Sept. 15-17.—IRISH ASSOCIATION OF GAS MANAGERS.—Annual meeting in Belfast.

Oct. 19-21.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual conference and general meeting in Plymouth.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Annual Outing.

The Annual Outing of the Scottish Junior Gas Association (Eastern District) took place at Anstruther on June 6, when there was a large attendance of members, many of them being accompanied by their lady friends. On arrival at the gas-works in the forenoon, the visitors were received by Baillie David Cook (Chairman of the Company) and Mr. D. Campbell (Manager), who conducted them round the works. Considerable interest was shown in the Tully plant in operation, and in the well-designed exhauster house; and there were expressions of admiration of the general cleanliness of the plant. The members then paid a visit to the Cellardyke oilskin and knitting factory, at the invitation of Messrs. John Martin & Co.

Luncheon was served in the Mansfield Boarding House. Baillie Cook presided, and was supported by Dr. Wilson and Messrs. T. S. Laverock and W. S. Bonthron, Directors of the Gas Company.

Mr. ALAN CLARK, Vice-President of the Association, replying to the welcome from the Chair, congratulated Anstruther and Cellardyke on their efficient and up-to-date gas-works, and thanked the Board and Mr. Campbell for the splendid arrangements made for the visitors.

In the afternoon, members, accompanied by their lady friends, enjoyed a motor drive to St. Andrews, while a golf competition had also been arranged. Later, the party were entertained at tea in the Gas Company's showroom, Baillie Cook again presiding. At the conclusion of the repast Mr. Blackhall, Edinburgh, presented the golf prizes, which were won by Messrs. Clark (Perth) and Yuill (Dundee).

Provost READDIE, Secretary of the Company, in associating himself with the Chairman, then spoke of the pleasure it afforded the Board to have a visit from the Association. He traced the history of the Company during the past thirty years, and remarked on the cordial relationship which had always existed between the Board and their officials.

Mr. CAMPBELL also expressed his pleasure at seeing so many members present. Speaking of the gas-works, he said that the Directors had always been willing to assist and support any schemes for the betterment of the concern, and were always keen to keep up-to-date.

Mr. CLARK returned thanks for the splendid reception the Association had received; and this brought a very enjoyable outing to a close.

London and Southern District Junior Gas Association.—It is requested that all communications in connection with this Association should be addressed to the new Hon. Secretary, Mr. J. H. Goldsmith, 6, Crystal Palace Station Road, S.E. 19; and subscriptions to the Hon. Treasurer, Mr. H. F. G. Soar, 16, All Souls Avenue, Willesden, N.W. 10.

NATIONAL GAS COUNCIL.

Meeting of Central Executive Board.

The Central Executive Board of the National Gas Council met on Tuesday, July 14, at No. 28, Grosvenor Gardens, S.W.—Mr. D. MILNE WATSON in the chair.

SPECIAL ORDER PROCEDURE—REPORT OF LORDS' COMMITTEE.

The fact was recalled that in June, 1924, a Select Committee of the House of Lords was appointed to consider this question, in order that adequate parliamentary control might be preserved. The Council at that time had submitted a memorandum to the Select Committee, pointing out that the existing procedure as outlined in section 10, sub-section (4), of the Gas Regulation Act had been of immeasurable value in enabling the smaller gas undertakings to bring their Private Acts up to date in an inexpensive and expeditious manner, and that any alteration of such procedure might be a very serious matter.

It was reported that the Select Committee of the House of Lords had now issued their report, and that, briefly, it recommended that a Standing Committee, to be known as the Special Orders Committee, should be appointed to consider Special Orders as soon as they were laid upon the table of the House. If no petition against the Special Order was presented, the Special Orders Committee reported to the House. Where, however, a petition was presented, the Special Orders Committee examined the Order, and considered it with regard to the following points:

(1) Whether the private rights affected were substantial.
(2) Whether the matter had been adequately dealt with at a departmental inquiry.
(3) Whether the submissions in the petition could have been brought before a local inquiry, and were not.
(4) Whether, having regard to the answers to the preceding questions and to the findings, if any, of these inquiries, and to the other circumstances of the case, there ought to be a further inquiry by a Select Committee.

It was feared that these recommendations might make it difficult to get Orders through as quickly as at present, and that undertakings would probably be put to a good deal of expense by frivolous objections which might be brought before the Standing Committee.

The steps which the Associations representing gas, water, and electricity had taken with regard to this matter were reported.

ROADS IMPROVEMENT BILL.

It was reported that, when the Bill was in Committee in the House of Commons, an amendment was put down on behalf of public utility undertakers, asking for compensation for any damage to their sub-surface apparatus which might occur as a result of the experiments authorized by the Bill. The Minister of Transport had, however, stated that public utility undertakers were amply protected under the ordinary law, and the amendment was thereupon withdrawn. Subsequently Counsel's opinion (Mr. Tyldesley Jones) was taken on behalf of the public utility undertakers, and it was to the effect that it would be almost impossible for a public utility undertaking to succeed in any claim for damages against the Minister of Transport. This opinion was forwarded to the Minister of Transport, who forwarded to the Council a memorandum setting out the reasons why he differed from the view of Mr. Tyldesley Jones.

A conference thereupon took place between representatives of public utility associations, the Council's Parliamentary Agents, and Mr. Tyldesley Jones; and a further statement was prepared for submission to the Ministry of Transport.

As the result of a further conference at the Ministry of Transport, the Ministry have agreed in principle to the justice of the request of the public utility undertakers; and the present position is that the Ministry are drafting a short protective clause on the lines of section 308 of the Public Health Act, 1875, which will be submitted to the Council, and, if approved, will be inserted when the Bill reaches the House of Lords.

NORTHAMPTON GAS SPECIAL ORDER.

It was recalled that this Special Order had already been considered by the Board, who had authorized Counsel's opinion to be taken on behalf of the Northampton Gas Company. The Northamptonshire County Council were endeavouring to have the Special Order referred to a Select Committee in the House of Lords, because the Gas Company had refused to insert a particularly onerous protective clause. It was reported that several meetings had taken place during the past month between representatives of the Gas Company and the County Council, but agreement was impossible, and it seemed inevitable that the matter would have to be fought out before a Select Committee—possibly a Joint Committee of both Houses of Parliament.

COMMITTEE ON INDUSTRY AND TRADE.

It was reported that the President of the Council had given evidence on behalf of the Council before the Committee on Industry and Trade on the 1st inst. A very full memorandum was prepared for the Committee, which will be reprinted in the Monthly Report of the Council, for the benefit of members.

HUYTON AND ROBY GAS COMPANY V. THE LIVERPOOL CORPORATION.

It was stated that this case was tried at Liverpool in May of this year, and judgment was given for the Gas Company for the full amount claimed, with costs. An appeal had been entered by the Liverpool Corporation upon the statutory defence of the Public Authorities Protection Act, 1893, and the Gas Company had asked for financial assistance from the Council in respect of the appeal. Upon hearing all the facts of the case, the Board agreed to assist the Gas Company, in view of the fact that the interpretation of the last words of section 1 of the Public Authorities Protection Act, 1893, was a matter that affected the industry in general.

ROAD EXHIBIT AT WEMBLEY.

It was reported that the exhibit at Wembley represented a remarkably good example of what could be done when a suitable tar was used and the tarred macadam properly made and laid. The specification of the tar and aggregate used on the exhibit was being published in the Monthly Report of the Council, and would also be circulated among those interested.

COMMITTEE ON NATIONAL DEBT AND TAXATION.

It was reported that Lord Colwyn's Committee were hearing evidence with regard to national debt and taxation. Representatives of the Law Society had appeared before the Committee recently, and had drawn special attention to the *ad valorem* stamp duties affecting limited joint-stock companies, stating that the duties at the time of formation of companies were far too heavy, and were undoubtedly hindering the increase of registrations. The witnesses put forward the suggestion that the duty on the capital of limited companies should be restored to 5s. per £100, and the rate of conveyance duty to 10s. per £100. They had also suggested that no conveyance *ad valorem* duty should be charged in certain cases—*e.g.*, in the case of a business sold to a private company. It was agreed that the Council should give evidence before Lord Colwyn's Committee as to the position of the gas industry.

WORKMEN'S COMPENSATION INSURANCE.

It was reported that one of the firms operating the scheme of workmen's compensation insurance inaugurated by the Council had gone into voluntary liquidation, but that Messrs. Robert Crawford & Co. had purchased the goodwill of the firm in question, and were in possession of all the particulars. Undertakings affected had been advised and informed that the liquidation of the firm in question would in no way affect the validity of their existing policies; that Messrs. Crawford would in future deal with all questions of claims in respect of existing policies and renewals, or new business; and that they would be able to place the risk on the original terms arranged by the Council.

It was agreed that, as usual, the next meeting of the Central Executive Board should take place on Tuesday, Sept. 8.

HYDROGENATION AND LIQUEFACTION OF COAL.

In the "JOURNAL" for April 22, p. 242, a short account was given of the work of H. G. Shatwell and J. Ivon Graham on the action of hydrogen at high pressures (100 atmospheres and over) on the microscopic ingredients of a highly-oxygenated non-coking coal, and on a coal of high carbon content from the Craigola seam, South Wales. Further investigations have been carried out on a sample of coal from the Arley seam, Lancashire (a comprehensive account of this seam is given in Bulletin No. 3 of the Fuel Research Board, which was abstracted in the "JOURNAL" for Nov. 5, 1924, p. 358); and the results of these investigations were published in the June issue of "Fuel in Science and Practice."

The hydrogenation of Arley coal during 12 hours at a maximum temperature and pressure of 430° C. and 127 atmospheres has rendered 67·6 p.ct. of the original ash-free dry coal soluble in phenol, while 61·4 p.ct. became a chloroform-soluble liquid. Similar treatment in an inert gas (nitrogen) converted only 7·7 p.ct. of the coal into a substance soluble in phenol.

The total quantity of hydrogen consumed during hydrogenation was 3·76 p.ct. of the Arley coal employed; that fixed in the liquid and solid reaction products being 2·31 p.ct. The liquid product does not consist entirely of hydrocarbons, but includes appreciable proportions of sulphur, nitrogen, and oxygen containing substances.

The yield of oil is substantially greater than was obtained when the Craigola coal and the clarain, durain, and fusain from a non-caking coal were submitted to similar treatment.

"Income-Tax Up to Date."—This is the title of a useful and clearly-written booklet dealing with the rules and regulations for the current income-tax year. Written by Mr. H. J. Gully, it is published by the "Financial News," at the price of 9d.

THE INSTITUTION OF GAS ENGINEERS.

Council Meeting

A meeting of the Council was held at No. 28, Grosvenor Gardens, Westminster, on Wednesday, July 15; the chair being taken by the President, Mr. CHARLES F. BOTLEY. There were also present Messrs. John Wilkinson and H. D. Madden (Vice-Presidents); Messrs. John M. Campbell, John W. M'Lusky, Hubert Pooley, Charles S. Shapley, C. Dru Drury, Douglas H. Helps, John Terrace, C. Rhodes Armitage, Harold E. Copp, Leonard J. Langford (Ordinary Members of Council); Mr. F. A. West (Eastern Counties Association), Mr. F. H. Robinson (Manchester District Institution), Mr. James Campbell (North British Association), Mr. W. W. Atley (North of England Association), Mr. Philip G. G. Moon (Southern Association), Mr. W. H. Johns (Wales and Monmouthshire Institution); Messrs. Samuel Tagg and J. Ferguson Bell (Past Presidents); and Mr. W. E. Price (Hon. Secretary).

The minutes of the previous meeting having been confirmed, the election of Mr. W. W. Atley, of Stockton-on-Tees, as District Member of Council representing the North of England Association, was reported.

Applications for membership were considered, and the following names were approved for inserting in the next ballot list:

For the Class of Member.—Mr. Beaumont Hudson, Engineer and Manager, Pontefract, and Mr. Herbert Sutcliffe, Manager and Secretary, Gas-Works, Gowerton.

For the Class of Associate Member.—Mr. Bernard Clarke, Assistant Engineer, Long Eaton, and Mr. John Walton Pallister, Technical Assistant, Middlesbrough.

Mr. Charles Bateman, Assistant Engineer, Cardiff, was transferred from the class of associate member to that of member; while Mr. Reginald Nelson Le Fevre, of Brentford, was admitted as student of the Institution.

Letters acknowledging their election as honorary members of the Institution were received from the respective Presidents of the American Gas Association, the Canadian Gas Association, the Société Technique de l'Industrie du Gaz en France, and the Swedish Gas Association.

It was reported that the President of the Institution had been elected an honorary member of the Société Technique de l'Industrie du Gaz en France.

A letter was considered from Mr. F. W. Cross, of Lea Bridge, with reference to the mode of election of officers of the Institution, and the matter was referred to the Emergency Committee.

Consideration was given to the question of the place and date of the annual meeting in 1926, and on the proposal of the President it was agreed that the meeting be held in London, commencing Tuesday, June 8. At the request of the Council, the President promised to consider the possibility of a visit to Hastings on Friday, June 11.

A communication from Mr. Leather (Chairman of the Refractory Materials Joint Committee) was presented, indicating that the Department of Scientific and Industrial Research were disposed to continue their support of the British Refractories Research Association, under which body work for the Institution of Gas Engineers was being carried out. The Institution have agreed to increase their annual grant for the next five years to the sum of £250.

The President made a statement with reference to the work of the Gas Investigation Committee, in which he communicated the information that Dr. Charles Carpenter had offered to place at the disposal of the Committee the results obtained at the laboratories of the South Metropolitan Gas Company. It was resolved that the cordial thanks of the Council be conveyed to Dr. Carpenter for his valuable assistance.

Mr. Shapley, in whose hands the Committee had placed the oversight of the work at Leeds on the Corbet Woodall experimental plant, reported that the arrangements decided upon by the Committee for further work on the plant were well in hand. Authority was given for the necessary expenditure. It was decided to hold a meeting of the Gas Investigation Committee as soon as it was possible for this work to be further reported upon. The Council expressed their thanks to Mr. Shapley for his assistance in this matter.

A letter was received from the British Engineering Standards Association with reference to the initial experiments on cast-iron pipe sockets, and asking whether the Institution would guarantee a further sum not exceeding £25. It was agreed to accede to this request.

Consideration was given to the question of the representation of the Institution on the Illumination Sectional Committee of the British Engineering Standards Association; and it was agreed that Dr. Thomas, of the South Metropolitan Gas Company, should be nominated as an additional representative, if possible.

A letter to the Gas Light and Coke Company, through the National Gas Council, from the Institute of Patentees on the question of inventions in connection with heat and heating, was referred to the Emergency Committee for consideration.

Arrangements for the visit of the Institution of Gas Engineers to the Shipping Engineering and Machinery Exhibition, which is to be held at Olympia from Nov. 23 to Dec. 5 next, were considered; and it was stated that the visit would probably be either on Friday, Nov. 27, or on Wednesday, Dec. 2.

The programme of the Public Works, Roads, and Transport Congress, which is to be held from Nov. 19 to 26 next, was reported. At the session allocated to the Institution of Gas Engineers, the following papers are to be read and discussed: "Public Lighting by Gas, with Special Reference to Automatic Systems," by Mr. C. S. Shapley, of Leeds; and "The Valuation of Gas Undertakings for Rating Purposes," by Mr. George E. Evetts, of London. The desirability of arranging for a paper on the use of tar for road surfacing was discussed, and it was decided that an endeavour should be made, in conjunction with the Tar Committee of the National Gas Council, for such a paper to be presented.

It was agreed that the ensuing meeting of the Council should take place in London on Thursday, Oct. 22. The Committees of the Council meet on the usual days as far as possible.

Arising out of the recent annual meeting, a letter from the Prince of Wales, Hon. Life Member of the Institution, addressed Pietermaritzburg, was reported, acknowledging the Institution's message of good wishes which was despatched to His Royal Highness.

A letter from the Institution of Civil Engineers was read acknowledging the consent of the Council to take part in the new scheme of publication of "Engineering Abstracts" of the Institution.

An invitation from the Institution of Public Lighting Engineers for the representation of the Institution at the second annual meeting and conference was received. The Council have appointed the President (Mr. Charles F. Botley) and the Vice-Presidents (Mr. John Wilkinson and Mr. H. D. Madden) to represent the Institution.

The report of the Coal Gas and Fuel Industries Department of the University of Leeds was communicated to the Council, and satisfaction was expressed with the contents of it.

It was reported that the Société Technique de l'Industrie du Gaz en France had awarded to Mr. Thomas Goulden, Past President of the Institution, a medal for the paper which he presented to the Société at their jubilee meeting last year.

The receipt from the Director of the United Kingdom Exhibits of the British Empire Exhibition of a bronze medal and certificate to commemorate the participation of the Institution of Gas Engineers in the British Empire Exhibition, 1924, was reported.

It was also reported that the University of Leeds had presented to the Institution an auto-type reproduction of Professor Smithells' portrait, bearing his autograph, the reproduction having been passed by the artist, Mr. Fiddes Watt. Recent donations to the Library include from the Bryan Donkin Company, Ltd., of Chesterfield, a model of an improved Beale exhauster of the latest two-blade type, and a model of a 4-bladed exhauster. M. Paul Bachelay, of Toulon, had presented a specimen of the Nédar tube which had been described in a paper read at the recent meeting of the Société Technique de l'Industrie du Gaz en France, held at Vichy.

A letter was read from Mr. W. V. Ray, LL.B., of Port Adelaide, Australia, expressing on behalf of his father, Mr. Wm. Ray, who had been a member of the Institution for many years, his appreciation of the Council's action in entering his name on the list of aged members who have distinguished themselves in their professional careers.

A New Paint.

A chemist in the employ of the South Staffordshire Mond Gas Company has evolved a formula for a new bituminous paint. When tested, this paint exceeded the most sanguine expectations. It was found to be impervious to the effects of acids, gases, water, and extremes of heat and cold. The uses to which the new paint can be put, we are informed, while still far from being fully explored, may be judged from some of the results that have been achieved. When applied to a gas plant at a temperature of 725° Fahr. it remained for several months as fresh as on the day of application. Another variety was found to dry in the remarkably short space of ten minutes. The essential principle of the paint is bitumen of various kinds so combined as to make them extremely colloidal or adhesive. Practical test has proved that it "keys itself" into the metal and wood to which it is applied, and is capable of expanding and contracting with it, thus avoiding cracking. The paint has now been subjected to exhaustive trial in all the works of the Mond group, including colliery working in Staffordshire. Fully convinced, at length, of the value of the paint as a preventive of corrosion, Sir Alfred Mond recently financed a Syndicate to put the invention on the market—in two forms, one for metals, the other for wood. It has already been taken up by leading firms of engineering contractors, railway companies, and shipping concerns; and it is significant that Japan has just imported a large ship-load for use in the rebuilding of the areas devastated by earthquake.

Blacks and Pitches.—We have received from Ernest Benn, Ltd., a new volume, entitled "Blacks and Pitches," by H. M. Langton, M.A., B.Sc., A.I.C. It is one of the Oil and Colour Chemistry Monographs; and the price is 15s. net.

BREEZE FIRING FOR SMALL HORIZONTAL SETTINGS.

[From a paper by M. Winkler at the Annual Meeting of the Société Technique.]

The excellent results and economy realizable from the Wilton grate, burning coke dust, breeze, or pickings, suggested once more the use of such low-grade fuels for heating ordinary retort settings. It is not a new problem, for as long ago as 1885 experiments were carried out at Saint-Josse Ten Noode, and described by M. Pettré at the 1894 Congress. He equipped two settings in the first place, then four, and later six, and ran them on breeze according to its varying production. But he found it necessary to do away with the middle retort in a setting of seven, and the consumption of steam for his grate was excessive.

After briefly describing the Wilton grate, which is well known to the majority of engineers in this country, the author states that its principal advantage is that it permits the combustion of small low-grade fuel in a bed sufficiently deep for the production of CO and its burning to CO_2, while steam is decomposed in the hot zone. The grate itself is kept comparatively cool, and what clinker is formed is easily dealt with. The paper gives a cross-sectional drawing of a small setting of five oval retorts; but the details are left very much to the imagination. As for the steam requirements, which might appear serious on a small works, less than 10 kg. is required per hour; and the problem is readily solved by a small waste-heat boiler (a rough diagram of a suggested type is given) or a small gas-fired boiler.

Discussing the costs of such a method of working, the author supposes a bench partly with ordinary settings and partly with Wilton grates. From the pan ash of the former, one picks unburnt coke; and from the screenings of coke for sale, one obtains dust and breeze. Taking a make of 1 million cub.m. per annum from 3,450,000 kg. of coal in ordinary settings (say, three at a time in firing) one has:

Coke produced	2,415,000 kg.
,, for producers	690,000 ,,
,, for sale	1,725,000 ,,

In a works of such size, one would not be far out in estimating at 140,000 kg. the mixture of unburnt coke and ash from the producers and retort-house sweepings. Complete picking should yield

35,000 kg. of beans, 4500 to 5500 calories.
45,000 ,, ,, smalls, 3000 to 4300 ,,

The total coke yield of the station can thus be tabulated as follows:

—	Kg.	Value. Francs.
Coke recovered	50,000	..
Dust from 1,725,000 kg. before breaking	80,000	..
From 1,725,000 kg. after breaking—		
Dust	324,000	15,890
Breeze	320,000	22,400
Seconds	796,670	154,000
Best	204,330	
	1,775,000	192,290

Now suppose that two of the three settings are fitted with Wilton "economizer" grates, and one left with an ordinary producer. One would replace 460,000 kg. of 6000-calorie coke, originally used for two ordinary producers, with 550,000 kg. of 5000-calorie small coke for the Wilton grates; the latter being made up of

17,000 kg. of recovered coke.
100,000 ,, screened smalls.
324,000 ,, of dust.
109,000 ,, of breeze.

550,000 kg.

There remains for sale:

Breeze	211,000 kg.	..	Value, 14,770 frs.
Seconds	796,670 ,,	..	,, 154,000 ,,
Best	204,330 ,,		
Saved	460,000 ,,	..	,, 67,160 ,,
	1,672,000 ,,	..	,, 235,930 ,,

It is seen that in the latter case only 211,000 kg. of poor-quality material remains, as against 774,000 kg. in the former. The values shown are fair average ones, and the saving in fuel is:

235,930 − 192,290 = 43,640 frs.

From this falls to be deducted 1120 frs. representing 160 tonnes of steam at 7 frs., and 600 frs. for interest on capital outlay, so that the net economy is 41,920 frs. M. Winkler considers that the saving is sufficiently attractive to justify the outlay, even if a little auxiliary boiler has to be included.

IGNITION OF CARBON DISULPHIDE VAPOUR.

In a long investigation on the ignition-point of gases in air and oxygen, now being carried out for the Mines Department, experiments were made by Prof. Harold B. Dixon on the vapour of carbon disulphide, both when heated alone and when mixed with other gases. In the course of these experiments certain anomalies were noticed which led to a fuller study of the initial phase of combustion of CS_2, and of the curious effect of ethylene and other gases on the ignition of this vapour first observed by Sir Edward Frankland, who communicated his results to the "JOURNAL OF GAS LIGHTING" in May, 1862.

A paper on "The Ignition of Carbon Disulphide Vapour and its Phosphorescent Flame," by Prof. Dixon, has recently been published in the "Recueil des Travaux Chimiques des Pays-Bas;" and from this we reprint the following conclusions.

The products of the phosphorescent combustion of a 80 : 20 mixture of CH_4 and CS_2 are mainly CS and SO_2. The former can be collected as a brown-red film on porcelain held in the flame; or, by allowing the escaping stream of gas to strike downwards against baffle plates, a fine brown powder collects in heaps where the stream impinges.

The brown powder is chiefly formed in the phosphorescent flame; only a trace of "smoke" can be detected where no phosphorescence is visible.

The phosphorescence does not originate where the fresh air first meets the CS_2 vapour; it always starts well above the jet.

The brown-red film of carbon monosulphide deposited on the heated wall can itself become luminous and start the phosphorescent flame.

A trace of gas which "poisons" the phosphorescence also inhibits the formation of a deposit.

The poison gas has no action when brought into the phosphorescent flame; to be toxic it must be mingled with the air that first meets the gas, or be mixed with the gas before it issues into the air.

On the assumption that the main reaction of the incipient combustion is represented by the equation

$$CS_2 + O_2 = CS + SO_2$$

it is easy to imagine this reaction being too slow to exhibit phosphorence or give a visible deposit when the gas and air begin to mingle under the conditions of the experiment. But if the CS molecule first formed, or the larger aggregate formed by the coalescence of 2 or 3 such molecules, has the power of holding a CS_2 molecule, such attached molecule may be more readily attacked than a free one—and so another CS would be added to the group. In this way the growing aggregate would offer a larger surface as the gases ascended, and finally the phosphorescent flame might appear when the process of polymerization made a sufficiently sudden advance. The poison may be supposed to act by condensing on the surface of the CS at an early stage, and so preventing its action as a nucleus. Once the aggregate has been allowed to grow relatively large, the poison may be insufficient to prevent the condensation of CS_2 molecules on its surface, so that when introduced into the flame itself the "poison" is inert.

The interest of the study of these low-temperature flames lies in the evidence it brings of the wide space through which reacting molecules can be traced when gases begin to combine. A stream of carbon disulphide vapour, which gives a normal flame between 15 and 25 mm. in height and 4 mm. in breadth at its widest, shows a phosphorescent flame which outlines a volume more than 100 times greater than that of the normal flame.

If other gases, such as hydrocarbons, *begin* their burning by any similar process of incomplete combustion—as seems most probable—we should expect to find their ignition temperatures largely influenced by the solid walls of the vessel, which may be reached even in a large furnace (such as we used) within a few seconds from the moment of issue from the central jet. The importance of using a wide outer cylinder and of observing the interval of time between the moment of contact of gas and air and the ignition is thus confirmed.

A Correction.—In the article by Mr. F. G. Gorman, on "A Novel Method of Driving a Fan through Gearing from a Gas-Engine," which appeared in our issue for July 8, p. 106, reference was made to Messrs. Bostock & Bramley, and their address was given as Huddersfield. The firm ask us to point out that their business was transferred from Huddersfield to Dewsbury Road, Leeds, over twelve months ago.

Case-Hardening and Heat-Treatment by Gas. — The "B.C.G.A." have issued a number of "A Thousand-and-One Uses for Gas" showing how the industry helps metal workers to reduce costs. It contains papers by Mr. E. A. Leask, of the City of Leeds Gas Department, and Mr. H. R. Hems, of the City of Birmingham Gas Department, which are useful to manufacturers interested in the heat-treatment of metal.

ANNUAL MEETING OF THE SOCIETY OF CHEMICAL INDUSTRY.

"COKING PRACTICE" AND "SMOKELESS FUEL" SYMPOSIA.

Abstracts of Papers and Discussions.

THE Annual Meeting of the Society, which was held in Leeds from Monday, July 13, to Saturday, July 18, was a conspicuously successful affair from every point of view. There were some 250 members and friends, in addition to a party of 60 from the United States, representing the American Institute of Chemical Engineers, at the invitation of the Institution of Chemical Engineers in this country, with whom a joint meeting was held on Friday, July 17. The proceedings started on the Monday, when there was an informal reception in the ballroom of the Queen's Hotel by the President of the Society (Mr. W. J. U. Woolcock, C.B.E.) and the Chairman of the Yorkshire Section (Mr. John Evans).

On Tuesday the general business meeting took place in the Philosophical Hall, Leeds; but a civic welcome was first given to the Society.

The DEPUTY LORD MAYOR (Councillor John Lambert), offering the Society a hearty welcome in the unavoidable absence of the Lord Mayor of Leeds, said Leeds could not claim to have produced many great men of science, yet there was present that morning a valuable citizen, and a gentleman for whom they had a very great regard—Sir Edward Brotherton, who had some connection with chemical industry.

Dr. J. B. BAILLIE (Vice-Chancellor of the Leeds University) also gave the Society a hearty welcome on behalf of the University. He believed they would appreciate that the University was doing its best to foster and encourage the scientific side of industry. Science nowadays, as the Society of Chemical Industry indicated, meant business. Without the science of chemistry, the industries in the City of Leeds and elsewhere could not be carried on. Science also meant team work. It was impossible to do the work of science nowadays without co-operation between individuals and industry. Only on the basis that science was discovering universal ideas, and that in order to develop these ideas it was necessary to unite resources and pool intellects, was it possible to make the greatest use of science, not only in the interests of science, but also in the interests of mankind.

The PRESIDENT then said it was his pleasant duty to present to their old friend and distinguished colleague, Mr. Walter F. Reid, the Society's medal. Mr. Reid had been a pioneer in many industries, both at home and abroad, where his remarkable knowledge, ripe experience, and powers of invention had been of tremendous service. He would simply mention smokeless powder, linoleum, and the cement industry, all of which owed a great deal to Mr. Reid. He had been President of the Society and Chairman of the London Section, and had been a member of the Council for many years.

Mr. WALTER REID, in the course of his acknowledgment, remarked that some of the buildings in Leeds took on an ancient appearance which one could not get in London until the buildings were falling to pieces. He believed—and he had some reason for saying so—that the coating which was sometimes found on buildings in Yorkshire was a preservative. Quite recently there had been reports, with regard to the Houses of Parliament in London, that there was a great deal of corrosion going on; and it rather seemed that if a number of coats of varnish of Yorkshire coal were put on the outside, the chemical constituents of the stone would be preserved, and it would not be necessary to spend half-a-million or a million sterling, as was now proposed. He believed that the magnesium limestone stood-up better in towns where there was a little smoke to help it. He did not speak without some knowledge of the subject, because he was a member of the Council both of the Coal Smoke Abatement Society and also of the London Society, whose object in both cases was the preservation of the beauty and amenities of great cities.

The PRESIDENT next delivered his address, which dealt with the subject of dyestuffs.

The HON. TREASURER (Mr. E. V. Evans), in presenting the accounts, said that, although the Council had hoped to be able to show a balance on the right side this year, that was not the case. It would be a simple matter to curtail the responsibilities of the Society so that the accounts would show a surplus. By reverting to the publication of a more academic periodical, and to one issued less frequently, expenditure would be reduced, but their "Journal" would fail to be of universal value in the chemical industry, and would interest only the chemists and chemical engineers engaged in it.

The presentation and adoption of the Council's annual report followed; and it was decided to hold next year's meeting in London.

In the afternoon a visit was paid to the University of Leeds, when the Coal Gas and Fuel Department was inspected.

COKING PRACTICE SYMPOSIUM.

On Wednesday morning, there was a symposium on "Coking Practice" in the Philosophical Hall, presided over by Prof. J. W. COBB (Department of Coal Gas and Fuel Industries, Leeds University).

The CHAIRMAN said it was now generally agreed that progress towards any properly worked-out rational system of using fuel and of arriving, on the way, at smokeless cities was bound to involve the process of carbonization. The symposium was to consider one aspect of carbonization—viz., the production of coke—and this served to illustrate the point that carbonization could no longer be considered as one process. It was no longer permissible for the coke-oven manager to think in terms of coke alone; nor could the gas manager think in terms of gas alone. The balance-sheet must take into account all the products and the cost of their production.

INFLUENCE OF ASH CONSTITUENTS ON THE COKING PROCESS.

By DR. R. LESSING.

In pursuance of his previous work on the ash-forming constituents of coal, the author deals in this paper with the way in which they affect the carbonizing process. The ash acts in the first instance as a diluting impurity. Assuming a 10 p.ct. ash-content of coke, a dead weight of 1,275,000 tons is charged into British coke ovens per annum, requiring the equivalent of 1200 ovens with corresponding losses in fuel economy, handling, and capital charges. The inherent ash in the coking constituents, which amount to from 70 to 80 p.ct. of the bulk of coal, is no more than 2 p.ct. The greater part of the ash is distributed among the non-coking portions of the coal and the dirt. The ash reduces the coking power, and is largely responsible for the production of breeze.

Ash in coke is detrimental to the blast-furnace process by reason of the extra limestone required for fluxing silica and alumina and of fuel for melting the slag formed. It thus reduces the available heat in the hearth, the strength of coke, and its reactivity.

The difficulties of studying the active influence of ash composition on the coking process lies in our inadequate knowledge of the mode of combination of the inorganic compounds in coal and the chemical changes they undergo during carbonization.

The conversion of acid-soluble alumina in coal ash into acid-insoluble aluminium silicate in coke ash is demonstrated by detailed analyses. The work on the catalytic influence of the mineral constituents to which the author has given special attention for many years has been confirmed by recent researches of Cobb and practical observations of Baehr, Koppers, and others. In work lately carried out, the author found that the addition of small amounts of inorganic compounds affects not only the yield of coke and other products in high and low temperature carbonization, but also the chemical composition of the coke. The results throw some light on the important question of the properties of coke in regard to reactivity, combustibility, inflammability, and general structure.

Discussion.

The CHAIRMAN confessed to having been very much surprised at the results which Mr. Marson and himself had obtained when they began to add these ash constituents, not for the purpose of studying carbonization, but for the study of gasification processes. They had to prepare their carbonization samples first, and the results were so interesting that they turned on one side, to some extent, to investigate the ash problem a little further. Dr. Lessing, however, was the pioneer in this matter, and it was satisfactory to have this summary of his work.

THE HEATING OF COKE OVENS.

By R. A. MOTT, M.Sc., A.I.C., and R. WIGGINGTON, B.Sc., A.R.C.S., of the Department of Fuel Technology, Sheffield University.

The problem of uniformity of heating throughout the length and height of an oven wall is discussed. Reference is made to the methods adopted in coke oven practice—*e.g.*, in the "old" Otto, Koppers, Semet-Solvay, Coppée, and Simon-Carvés waste-heat and regenerative types of ovens, for the distribution of the gas and air, when typical dimensions of the oven chamber were: Length, 10 m. (32 ft. 10 in.); height, 2·0 to 2·5 m. (6 ft. 7 in. to 8 ft. 1 in.); and mean width, 0·5 m. (19¾ in.). The greater difficulties associated with the attainment of uniformity of heating throughout the height and length of a coke-oven wall when these dimensions are increased are referred to, as well as

the relative importance of radiation, conduction, and convection in heat transmission to the oven walls.

Increase in the length of an oven wall, particularly when accompanied by increase in the height and decrease in width of the oven—*i.e.*, with quicker coking—gives a much larger volume of gas to be carried per unit of time in the common flues. The application of Bernovilli's theorem to the difficulties associated with uniformity of gas and air distribution to each vertical flue in a set of flues is discussed.

Uniformity of heating throughout the height of an oven wall depends on the type of flame and its shape, which is affected by the velocity and temperature of the gas and air entering each flue, the design and inclination of the gas and air channels, as well as the design of the flue. The importance of the composition of the coke-oven gas, and the application of producer gas and blast-furnace gas, or the addition of waste gas with the air in coke-oven gas heating to lengthen the flames, is discussed.

In dealing with the mechanism of heat transfer, reference is made to the essential difference between the methods involved in heat transmission from vertical and from horizontal flues, and to the importance of current velocity in horizontally flued ovens. A collection of published work on radiation from flames is made, though a direct application to the problem of coke-oven heating is as yet not possible.

Discussion.

The CHAIRMAN said that in reading the paper he had been very much struck by the attempt that had been made—and he hoped it was an attempt which would be made more in the future—to place considerations of the design of the furnaces and coke ovens, and so on, upon a more rational basis. In text books, technical papers, and journals one got a lot of information of the descriptive kind which, though interesting in a way, did not, after all, lead very far. This paper was an attempt to get-down to some of the principles underlying design, and for that reason alone was warmly to be welcomed. It was a courageous attempt, because the complication of the design of coke ovens made the subject exceedingly difficult to deal with in this way.

Sir ARTHUR DUCKHAM thought benefits would accrue if the scientific side of research got closer into touch with the commercial side. This, as a matter of fact, was taking place to a quite considerable extent. In the case of his own companies, for instance, in designing ovens or carbonizing plants, they made calculations, and sometimes burned their fingers, more or less, with every plant that was put in. Plants were installed, and certain troubles arose. They were corrected, and so things went on. It would, however, be to the greatest advantage to their friends in Sheffield and in Leeds if the practical knowledge so obtained could be made use of by more scientific workers in the universities. A great deal of work remained to be done on the question of the conduction and radiation of the sensible heat, before one could say anything definite as to the proportionate part played by each.

Prof. J. W. HINCHLEY suggested that a careful study of the individual flues of the coke oven—especially at the junction of the flues, where the changes in velocity took place, and where eddies were formed—would form a valuable research, because there were great possibilities both for the manufacturers and the designers to make improvements.

Mr. MOTT briefly replied.

DISPOSAL OF SURPLUS COKE-OVEN GAS FOR PUBLIC SUPPLY.

By C. P. FINN., B.Sc., Manager of the Manvers Main Coke Ovens.

After reviewing the various possible uses for the surplus gas available from coke ovens, attention is drawn to the extensive and growing practice in the United States of regarding the coke oven as a primary source of gas for public supply, and incidentally the use of bye-product oven coke for central and domestic heating. It is pointed out that the use of coke-oven gas for public purposes in England has developed slowly, though in the Yorkshire area to a greater extent than in other coalfields. Examples are cited of large and small towns which actually use the gas, and of others which, although adjacent to likely supplies, appear to have ignored the opportunity that is at hand.

After the requirements of those towns actually in the coalfields have been met, there should be no difficulty in supplying places farther afield. Long-distance pipelines from the pit-head would reduce transit and marketing costs of raw coal; and bulk carbonizing on the coalfields should secure economy of production. The whole supply of gas in a group of the Dearne Valley townships, extending over about 17½ square miles, is supplied from the Manvers Main Company's coke ovens; and from his experience the author concludes that the statutory requirements may be met without recourse to double collecting mains or other devices to produce suitable gas. Analyses and data are given showing that a gas undertaking need have no qualms as to taking surplus coke-oven gas. The paper includes a bibliography relating to the subject.

The author submits that Great Britain has not yet exploited to the full the possibilities of the bye-product ovens, and points out that it is capable of producing suitable gaseous, liquid, and solid (metallurgical and domestic) fuels—a fact which appears to be overlooked by many advocates of less-tried and even untried processes of coal carbonization.

Discussion.

Mr. FULWELL (Philadelphia) said the solution of the question of coke-oven gas *v.* other forms of gas was very largely a matter of the coke market. A supply of gas continuously could not be relied upon unless there was a permanent market for the coke from the ovens. In the contracts that had been made in the United States he did not believe a continuous supply of coke-oven gas had been provided for; and so it was necessary to have a stand-by plant, in order that the town supply of gas should be maintained. This was certainly an objection. No difficulty had been experienced in obtaining fairly uniform heating value; but it was always essential to keep some form of benzole vaporizer available for emergency.

Mr. WADSWORTH mentioned that the organic sulphur content of coke-oven gas was considerably lower than that of coal gas when the benzole was extracted. There had been installed at his works a boiler of the Spencer-Bonecourt type; and he wished to place on record his satisfaction with it. It had saved an enormous amount of gas. There were gas meters and water meters working continuously on the boiler; and efficiencies up to 91 p.ct. had been recorded, while figures of from 85 to 87 p.ct. were being continuously obtained.

Mr. H. CHUTE (United States) mentioned a certain town in Minnesota, where a plant was put up in 1904 primarily for the production of coke for the manufacture of iron. The city gas plant had been in the hands of the municipality, but had been badly managed. A contract was entered into for a supply of coke-oven gas from the iron works, at 2s. per 1000 c.ft.; the arrangements being that the city authorities should re-sell at 3s. This had not only enabled the town to get cheaper and better gas, but it also enabled the iron works to run continuously.

Mr. J. W. LEE (Chesterfield) said the only thing required to-day in connection with the supply of coke-oven gas for towns was for the gas to be of a perfectly regular composition. It was possible for this to be accomplished, because for some years at Chesterfield they had put direct into the Corporation mains gas purified at the coke-oven plant; and, during the whole of this time, only on one occasion had there been a definite communication from the gas manager to say that the quality was not what it should be. Neither during the period, again with one exception, had there been any interruption to the supply. On the one occasion of interruption, something happened somewhere—nobody knew what—and it had never been settled whether the trouble was at the gas-works or the coke-oven end.

Sir ARTHUR DUCKHAM said that if arrangements could be made for coke ovens to supply gas for public purposes to a greater extent than was now the case, undoubtedly the price of blast-furnace coke would be lower and the coke-oven owners would be able to put in better and more modern plants for the supply of gas. Undoubtedly, also, the whole of the industries in this country which were based on coal, coke, pig iron, and steel would be in a far more flourishing condition. Speaking from the gas point of view, he knew that most coke-oven managers held the view that the gas manager in their neighbourhood was either a fool or a pig-headed idiot, or something of that kind, because they had approached gas managers and offered supplies of coke-oven gas at low prices, and could not get the offer accepted. But they must remember the responsibility which rested upon the gas manager in this matter, because he had to see to it that there was a constant supply of gas all the year round. In most cases it meant that the gas manager had to keep a plant to take care of the big loads and for emergencies; and such plants, of course, were very expensive to run. Again, the gas manager was blamed for making gas at a higher cost than the coke-oven people offered it him; but it must be understood that there were statutory obligations upon the gas undertakings of the country. These difficulties, of course, ought to be settled as between the coke-oven managers and the gas managers; and if that were done, then there would be one of the greatest developments the country had seen for a long time. Furthermore, recent work had foreshadowed other developments of coke ovens—viz., the popularizing of the use of blast-furnace coke for other purposes than blast furnaces, and the development of this work along the lines of providing a smokeless fuel for domestic use in this country. It was impossible to emphasize too much the importance of this subject; and he wished that all coke-oven managers and gas engineers in close proximity would get together and talk over their difficulties and requirements.

Mr. THORNTON DREW (Sheffield) remarked that although the author and others had in mind an ideal state in which there would be cities with no gas-works, and the gas supply would come from the coke ovens outside, yet there was something to be said on the other side. There was, unfortunately, in prospect serious labour trouble; and if they could picture the gas-works of the country washed-out altogether, and the lighting of great districts dependent on coke ovens, they must realize that it would be a situation of enormous anxiety.

Dr. G. WEYMAN said there were coke ovens which could supply gas suitable for public use, and there were others, not of very recent construction, which could not. Coke ovens which did supply a suitable gas would have to take precautions to keep their plant in a better state than coke ovens which did not. Perhaps the author could give some idea whether any extra cost was involved in maintenance in the one case as compared with the other.

Dr. E. W. SMITH pointed out that unless coke ovens could guarantee continuity of supply there was little use in gas undertakings considering the matter. Moreover, unless the coke ovens could ensure an ample and continuous outlet for their coke—such as that which at present enabled them to sell coke-oven gas very cheaply—they would not be able to continue selling gas or to distribute it over very long distances at an attractive price. On the face of things, it appeared that the coke ovens were in a happy position, in that they were able to make gas and supply it to gas undertakings at a price which was very much lower than that at which the gas undertakings seemed to be able to make it. Therefore it might appear that there was no argument about the subject; but the mere supplying to a gas undertaking of cheap unpurified gas did

not make-up more than about one-third of the actual cost to the distributor of that gas. One heard of coke ovens in the North selling gas at 2d., 3d., and 4d. per 1000 c.ft.; and the "man in the street" ran away with the idea that the gas undertaking was making an enormous profit when selling the same gas at 3s. per 1000 c.ft. But there were extremely heavy costs in putting the gas into the holder and purifying it, &c. Therefore, unless the coke ovens could find a continuous outlet for their coke, he did not think that any gas undertaking would be justified in taking the bulk of its supplies from coke ovens, for the reason that there was no certainty that the supplies would be maintained at the present low prices, or even at all.

Mr. W. J. A. BUTTERFIELD thought it could be accepted as a fact that coke-oven gas was eminently suitable, as to uniformity and quality, for town supply; and also that the principal bye-product—the coke—was in many respects and in many districts more suitable than gas coke for domestic use. Its superiority was largely due to the better selection, by the coke-oven management, of the coal, and the better blending of the coal which was carbonized. The other bye-products—such as tar—might be equally or more valuable than the corresponding bye-products from the gas-works. Therefore it simply became an economic question as to whether the gas supply, so far as its manufacture was concerned, should pass into other hands. The gas industry, during its 110 years' history, had an enviable record among the public supplies for continuity and trustworthiness in its supply; and in order to preserve the trustworthiness and continuity of an essential public service, it was necessary that the plant concerned with that service should not be subject to interruption or interference according to the demands from another industry, or on account of labour difficulties in that industry, over which the gas undertakers at present had no control. There was a movement afoot in some districts on the part of the gas undertakings to establish coke-oven plants on their works, or, what seemed more promising, to take charge of a coke-oven plant close by, in order that they might have control of the gas production. It was unthinkable, as was being done at present in a few cases, that large reserve plants should be maintained on a gas-works, which were only brought into play when there happened to be an interruption to the coke-oven supply.

At this point the discussion had to be closed, though many others desired to speak.

Mr. FINN, replying, said one speaker had mentioned the sulphur content. The sulphuretted hydrogen content, to be precise, of his own gas was 320 grains per 100 c.ft.; and, in passing, he might add that the hydrocyanic acid content was only 2 to 3 grains per 100 c.ft. expressed as HCN, which was considerably lower than in the case of most ordinary gas-works. Dr. Weyman had asked whether more money had to be spent by way of maintenance on a coke-oven plant supplying gas than on one not doing so. The answer was that coke-oven plants kept in a condition of maximum efficiency must of necessity obtain the best yields in coke and bye-products, and consequently the best quality gas; and it was up to the coke-oven manager so to operate and maintain his plant that he obtained the maximum efficiency. In reply to Dr. Smith, he did not suggest that coke ovens should supply the bulk of the gas all over the country; but what he did suggest was that the coke oven did not now receive the recognition it should as a carbonizing unit in this country. There were supplies of gas available from coke ovens at the present time in districts where they ought to be utilized instead of having coal-gas plants; and encouragement ought to be given for these coke-oven plants to be extended, in order that larger quantities of coal might be carbonized at the collieries than were being carbonized to-day.

COMPARISON OF SOLID ADSORBENTS PROPOSED FOR BENZOLE RECOVERY.

By W. H. HOFFERT, M.A., B.Sc., Research Chemist to the Joint Committee of the National Benzole Association and the University of Leeds.

Up to the present, benzole recovered from coal and coke-oven gases has been the only home-produced motor spirit. Owing to the increasing demands for motor fuels, processes which tend to increase the efficiency and reduce the cost of recovering benzole are of the utmost importance from the point of view of utilizing our coal resources to the best advantage.

In this country benzole is recovered by washing the gas with a suitable oil. During the past few years, however, attention has been drawn to the possibility of recovering the benzole by using certain solids which have the property of taking up, or adsorbing, considerable quantities of gases and vapours. The solid adsorbents which have received most attention are active carbon and silica gel. Iron oxide gel has also been suggested for the same purpose.

In applying such adsorbents to benzole recovery, besides the efficiency with which the benzole can be removed from the gas by the adsorbent, the maximum quantity of benzole which the adsorbent will take up from the gas under the existing conditions, and the ease with which this adsorbed benzole can be removed from the adsorbent, are important considerations, on which the cost of working the process will largely depend. Of equal importance from the economic point of view is the length of time the adsorbent is able to withstand the conditions of use without losing its adsorptive properties.

Apart from the question of the stability of the adsorbents, there are certain differences in their properties. Thus, active carbon is claimed to have a much greater adsorptive capacity than silica gel and iron oxide gel at low vapour concentrations, and also to adsorb selectively organic vapours in preference to water vapour. Considerable differences of opinion have been expressed as to the importance of these properties from the point of view of benzole recovery.

This paper gives the results obtained from a systematic examination of these adsorbents in the laboratory, under conditions resembling as far as possible those of benzole recovery practice. The point of chief interest arising from the results is that, although silica gel preferentially adsorbs water vapour, which exists up to saturation in coal gases, while active carbon, on the other hand, preferentially adsorbs benzole, silica gel nevertheless shows a satisfactorily high adsorptive capacity for benzole under benzole recovery conditions. Thus, although under these conditions the quantity of benzole taken up, calculated on the weight of the adsorbent, is only about half that taken up by active carbon, the quantities taken up by these two adsorbents, when calculated on the volume occupied by the adsorbent, which is important from the point of view of the size of plant, are practically the same.

The following comparative table was drawn up from the results of tests carried out on a number of typical samples of each of the three adsorbents proposed.

Maximum Quantities of Benzene taken up at Saturation by the Adsorbent at 20° C. in the Dry Condition, from a Gas containing 2½ Gallons of Benzole per 12,000 C.Ft., and Saturated with Water at 18° C.

—	Grammes of C_6H_6 Adsorbed per 100 g. Adsorbent.	Grammes of C_6H_6 Adsorbed per 100 c.c. Adsorbent Space.
Active carbon	15—30	5·8—11·6
Silica gel	8—14	5·7—10·0
Iron oxide gel	4—16	4·6— 7·0

The differences between various types of active carbon, in so far as they are of importance when using this adsorbent for benzole recovery, have also been investigated, and are discussed.

It is pointed out that although, from the point of view of adsorption by the dry adsorbents, selectivity is not of great significance under benzole recovery conditions, this property is important when considering the removal of the adsorbed benzole. In the case of active carbon, steam can be used to remove the benzole, while with silica gel the adsorbed benzole is best removed by means of dry heat. Iron oxide gel, which has a smaller adsorptive capacity than active carbon and silica gel under benzole recovery conditions, besides being selective towards water vapour, suffers from the further disadvantage that it cannot be heated above 250° C. without destroying its adsorptive properties.

The difficulties which have been encountered in practice in applying these adsorbents to benzole recovery, due chiefly to the presence of impurities in coal gases, such as "tar fog," high-boiling hydrocarbons, and unsaturated compounds which polymerize in contact with the adsorbent under certain conditions to resinous substances, are briefly discussed.

The conclusion is drawn that the adsorbent processes for recovering benzole offer many advantages over the oil-washing process—such as greater efficiency of extraction, smaller heat requirements, and a better product requiring less refining. It is hoped that satisfactory data as to the stability of these adsorbents under benzole recovery conditions will be available in the near future, so that a definite comparison of the adsorbent and oil-washing processes for recovering benzole from coal and coke-oven gases can be made.

The work reported in this paper was carried out on behalf of the Joint Research Committee of the National Benzole Association and the University of Leeds, by whose permission the paper is published.

Discussion.

The CHAIRMAN said the statements that had been made concerning these different solid adsorbents were, to put it mildly, not always consistent with one another; and it was felt necessary by the Joint Committee of the National Benzole Association and the University of Leeds to make a survey of the behaviour of two or three of these adsorbents—particularly silica gel and various forms of activated carbon—in order to know, with some exactness, what behaviour could be expected from them, not in the whole field of possible recovery of different substances, but over the narrow field with which benzole recovery in coke-oven practice and in gas-works practice was solely concerned. In this narrow field the survey had been made very thoroughly by the author.

Mr. J. ARTHUR REAVELL thought it would have been better if they had known more as to the grade of gel that was used. There was an impression about that there was only one grade of gel; but, on the contrary, there were a great many grades, and if as much information had been given in the paper as to the grade of gel used as there was concerning the carbon employed, it would have helped to a better understanding of the results put forward. Other gels, in his experience, had done better work under the same conditions as those indicated in the paper. There were commercial installations running in England to-day in which the gel was steamed-out directly to get rid of the benzole. With regard to tar fog, his experience had shown that in silica gel this was an absolute bogey. In a large installation, the type of gel used in the author's experiments would not be employed for the recovery of coke-oven gases. In taking out the benzene from coke-oven gas and also removing the ammonia, experiments on a fairly large scale had

shown that from the first activator ammoniacal liquor was obtained; and he was not at all sure that there was not a large field for silica gel for this purpose.

Mr. F. H. CARR said he only rose to urge the author—if he had not already thought of it—to try to arrive at a method for use in the laboratory by which to judge the adsorbent activity of various substances of the same nature—*i.e.*, different carbons or different samples of iron oxide or other adsorbents. If one could have some standard laboratory method by which to judge readily and simply what the likely adsorbent activity would be in practice, it would be of enormous value.

Mr. E. V. EVANS said that, to the gas industry, the charm of the process mentioned in the paper seemed to lie in the possibility of the complete removal of naphthalene and the removal to a very appreciable extent of carbon bisulphide and thiophenic substances from gas. Would the author be able to give attention to this aspect of the problem?

Mr. B. WILSON HAIGH (Jharia Coalfield, India) remarked that where benzole plants were in existence in the tropics—and there were several in India, one having been recently erected by Simon-Carves, Ltd.—there was a good field for working the silica gel process. He would like a little more information as to the effect of the sulphur in the gas on the adsorption. He was under the impression that it interfered considerably; and it would be a big problem if all the sulphur had to be taken out of the benzole first, though Indian coals contained only 5 p.ct. of sulphur, which was very much less than was the case in Great Britain.

Mr. HOFFERT, replying first to the point raised as to the grade of gel used in the experiments, said it had been necessary to take a gel which was suitable for the concentration at which benzene existed in the coal gas. He was rather surprised to hear that the gel could actually be steamed-out, and yet not leave any water in. Mr. Reavell had stated that the gel could be used repeatedly; and this was the kind of information he was trying to get. Those who had this work in hand wanted to know exactly how long it was possible to go on using the gel over and over again, and, after a given period, to what point its adsorptive capacity had been reduced. Then it would be possible to make a direct comparison between the processes. He quite realized the importance of the naphthalene problem mentioned by Mr. Evans; but the National Benzole Association were more particularly concerned with benzole removal.

On the motion of the PRESIDENT, seconded by Dr. LEVINSTEIN, a hearty vote of thanks was accorded to the authors of the papers, to those who had taken part in the discussions, and to the Chairman.

Abstracts of the three papers (and of the discussions thereon) which formed the Smokeless Fuel Symposium are held over until next week.

INSTITUTION OF CHEMICAL ENGINEERS.

PRESIDENTIAL ADDRESS OF SIR ARTHUR DUCKHAM.

THE Annual General Meeting of the Institution was held jointly with the American Institute of Chemical Engineers, in the Philosophical Hall, Leeds, on Friday last, following the meetings of the Society of Chemical Industry. In the morning, the business meeting was held, followed by addresses by Dr. C. L. Reese (President of the American Institute of Chemical Engineers) and Sir Arthur Duckham (President of the Institution of Chemical Engineers). Sir Frederic Nathan was elected President for the coming year; and a hearty vote of thanks was accorded Sir Arthur Duckham, not only for his work during the two years he has held the Presidency, but for the manner in which he has supported and assisted the Institution ever since its inception. In the afternoon there was a symposium on "Industrial Water Supply and Stream Pollution," at which nine papers were read. An abstract of one of these—by Dr. Lewis T. Bailey, Chief Inspector under the Alkali, &c., Works Regulation Act—is unavoidably held over.

Sir ARTHUR DUCKHAM, in the course of his Presidential Address, said that the chief responsibility of the Institution was to organize courses of technical education and examinations which would develop and stamp students as chemical engineers. Many meetings had been held with this object in view, and the advice of leaders in chemical industry had been taken, as a result of which a course of training had been drawn-up which was being submitted to teachers and educational authorities, so as to obtain further criticism and to get approved schemes adopted in the appropriate institutions. Many people had asked, "What is a chemical engineer?" The Council had had the temerity to attempt a definition, which was as follows: "A chemical engineer is a professional man experienced in the design, construction, and operation of plants and works in which matter undergoes a change of state and composition." This definition was rather wide, but he thought most of them could qualify on those lines. To give the "man in the street" a more concrete idea of the chemical engineer, he proposed to show how men trained on the lines laid down were essential to the utilization of this country's industries—coal, coke, iron, and steel. He felt the nation was in such a critical state to-day that he hoped they would not mind if he went a little outside the chemical engineer, and dealt more with the economic side for a little while.

To-day they were faced with a national crisis—a coal strike. During the past two years the condition of the coal trade had been growing gradually worse—partly due to the decreased purchasing power of foreign clients, partly to the falling-off of home demand, and partly to the lack of confidence and goodwill between those concerned in the production of coal. A reduction in the price of coal was the only immediate means of increasing exports; it was the first step in the improvement of home industries and trade. A reduction in the price of coal would follow the introduction of any scheme of true co-operation in the coal industry; that was the fundamental point in the industry. Those connected with the coal trade knew that very often agreements could be made to get better and more economical working conditions; but these agreements were not promoted, as they ran counter to some national agreement.

Yet those who knew the industry realized that, with the colossal variation in the coalfields throughout the country, it was almost impossible to get any agreement, either as to hours of work or pay, which would cover properly all districts and secure the best results. At present there was lack of confidence on both sides. The owners felt that they had been more than generous in the past in agreeing to participation in profits. They felt that they had not been met in the proper spirit by the worker, and that a crisis must be passed before general conditions improved. The worker, on the other hand, felt that he had not been fairly treated by the owners; that profits accruing from businesses ancillary to the colliery had not reached him. The mine worker was subject to the full blast of international competition, and resented receiving lower wages than men engaged in other trades sheltered from competition, which were less arduous and less skilled. Frankly, the miner did not appreciate why he should be penalized because he was a miner, and instinctively turned to the State, either for subsidies or nationalization. Cheap coal could be produced in this country, but not by uneconomical subsidies or national control. The cure for the industry lay within the industry; and all the Government could do was to bring the parties together sympathetically, study their difficulties, and help development by extending financial support to approved schemes.

Dealing with co-operation, Sir Arthur said the first necessity was to induce confidence. The ultimate aim of all parties must be the same—a prosperous industry. Owners and men fully realized that this aim could only be attained by reducing the selling price of coal. Co-operation must commence in the individual mine or group of mines. Legislation or national agreements must be so framed that this co-operation was possible in the different areas and under varying conditions. The same conditions of hours and work could not run through all coalfields. Moreover, he was certain that the owners would have to face a definite restriction of profits on mines. Given freedom of action, with proper safeguards, and confidence, he was sure that satisfactory arrangements for pay, working hours, and operation of the pits would rapidly follow. The owners must be prepared frankly to show to the men the financial position of the undertaking, and to discuss matters and ask for the assistance of the men in reducing costs, &c. They must also be prepared for a limitation of profits paid to capital. Very often one heard complaints from the miner as to the methods of working a pit. These complaints should be sympathetically examined, and the causes remedied when found.

Speaking of development, the President emphasized definitely that the salvation of the coal industry must come from within. The only way in which the Government could really help the coal industry was by assisting development. Subsidies could never bring an established business through a bad time to prosperity. What had done more than anything else to bring the crisis in the coal industry to the present position had been the whisper of subsidies by the Government. One heard of the wonderful electrical schemes which the Government were going to put forward this autumn; and there had been estimates of immense sums of money to be paid. There had been a good deal of criticism of the lines of that development; and it was quite possible that these lines might be economically unsound. There was also talk of subsidies or money to be advanced for other things. But there was one fundamental industry in this country—coal—and it seemed to him that the Government,

instead of considering the development of electrical supply, the question of low-temperature carbonization, and these other industrial matters that were before them, would do better to study how they could cheapen the price of coal and coke by assisting financially with advances on economical lines the development of the coal industry. This would be the quickest way to bring prosperity back to the country; and it was here that the chemical engineer came in. The development of the mine, the reconstruction of the shafts, the putting-in of new machinery, and so on, was more an ordinary engineer's job; but the cleaning of the coal—which was imperative—was the chemical engineer's job. He was convinced that by a proper development of coal cleaning—if the industry could be assisted by Government money, not by giving the money, but by lending it—the country would be helped enormously. Then there was the question of coke ovens. This was essentially a chemical engineer's job. If coke ovens were tackled properly, he was certain that the price of coke could be very substantially reduced. The chief competitors to-day of this country were Germany and America—although America did not interfere very much. Those who had visited these countries must have been amazed by the tremendous development that was going on there, especially with coke ovens and improved bye-product working. With economical bye-product working—with proper use of the gas, tars, &c.—the price of coke would come down; and the price of coke was immediately reflected in the price of pig iron and steel.

How was it that Germany could build coke ovens to-day in large quantities, while only one or two orders had been placed in this country for coke ovens during the past fifteen months? What was happening in this country to-day was that the colliery owner did not know how things stood, and felt that a crisis must come. On the other hand, the miner, ill-advised by some of his leaders, thought the only thing was nationalization of the mines, and that it was not for him to improve the present conditions and spoil the argument. There they had the two sides of the position. The two sides had been doing nothing, and in this way had driven the matter to a crisis. Confidence must be restored. He was positive that, with restored confidence, with proper technical knowledge applied to the development of the coalfields and the ancillary industries—such as coke, pig iron, and steel—where the chemical engineer could do so much to help, this country could become a prosperous nation. Until confidence was restored, there was no hope for them. Incidentally, on the question of subsidies, he could not understand the Government daring to talk about subsidies, when the taxation was so heavy. Subsidies meant higher taxation; and they must not have them at any price, because taxation was certainly the greatest burden to industry to-day.

Whatever the industry, they wanted chemical engineers as the administrators of their factories. He did not think it at all necessary that a chemical engineer should only have a chemical engineering knowledge, and not financial or commercial knowledge. If a chemical engineer did take an administrative job, he was far better qualified than the man who only had a commercial or industrial training in the normal way. Their really great leaders had had technical training. If he might take an industry in which he was specially interested—the gas industry—there the great leaders in the past, like Sir Corbet Woodall, Sir George Livesey, Mr. Charles Hunt, and others, who had made the industry what it was, were all technical men; and to-day one of the dangers of the gas industry was that the leaders were not technical men. Men like Mr. Milne Watson had done most wonderful service; but if they had associated with them men of the stamp of those to whom he had just referred, he was certain that their technical training would have been of the highest value. The future was extraordinarily promising for chemical engineers; he was certain that they had the plums of industry before them.

On the motion of Prof. D. D. JACKSON (United States), seconded by Prof. E. BARTOW (United States), a hearty vote of thanks was accorded Sir Arthur Duckham for his address.

Gas Heat for Stripping-Off Paint.

Weather-worn and dingy automobiles can now be stripped of their old paint in one-third of the time formerly required by hand labour, as a result of the application of gas heat to this work. The process, it is learned from the "Intercolonial Gas Journal of Canada" is based upon the use of an automatically controlled gas boiler, which maintains a constant supply of steam at the pressure needed, usually about 60 lbs. The hot steam is sprayed upon the car from a hose, through which is also fed a cleaning solution. When the car has been thoroughly sprayed with this mixture, it is washed with warm water, in which the old paint comes off like mud, leaving the body clean down to the bright metal. When the engine and other oil-coated parts are to be cleaned, pure steam from the gas-fired boiler is used, without the cleaning solution. It is said that the gas-boiler process will clean an ordinary car in three hours, with two men working, as against sixteen hours by hand work, and that the car will be cleaner of paint than it could ever be made by the old method of scraping.

FIXED GAS RATES, INDEPENDENT OF CONSUMPTION.

[TRANSLATED.]

At the Annual Meeting of the Swedish Gas-Works Association, held in Landskrona, on May 22 and 23, the question was discussed: "Why ought gas-works to introduce a fixed rate, independent of the consumption, and on what basis is this to be calculated?" At the request of the Board of the Association, the President (Mr. Ragnar Blomquist, Chief Engineer of the Stockholm Gas-Works) and the Vice-President (Mr. H. M. Molin, General Manager of the Malmö Gas and Electricity Works) had given the reasons for, and the advantages of, such a tariff in a communication which previous to the meeting had been sent out to the members, and which was now presented by Mr. Molin. The communication was as follows.

Apart from certain years during the war, when the price of gas was too low in comparison with the costs of production, the Swedish gas-works* in general have been able to show an annual surplus sufficiently large to pay the interest on the capital invested, as well as to meet the depreciation of the plant; and besides this their profits have often been considerable, which profits have been handed over to the municipal funds in aid of the rates. This has particularly been the case during the last few years, when the high prices of gas prevalent in war time have not been lowered as rapidly as the costs of production have fallen. Results have also been favourably influenced by the relatively high prices, compared with the cost of gas coal, obtained for the bye-products. However, the fact must be taken into consideration that things will be different in future. On the one hand, it is possible that the relation between the prices of coal and coke may be less favourable to the gas-works; and, on the other, the price of gas ought, if possible, to be further reduced for reasons given later.

Since the gas-works have been obliged practically to cede their once largest market—viz., the indoor lighting—to the electrical works,† as well as the greatest part, or some part, of the public lighting, and all gas motors, the undertakings have their main field confined to the domestic requirements for cooking, in which they have gradually been able to obtain a very important load. But even in this domain, as well as in that of industry, and in other new fields for heating purposes, where the gas-works, especially in recent years, have tried to gain ground, they have to reckon with keen competition from solid and liquid fuels, some of which have now come down in price considerably. In addition to this, also, the electrical works have lately endeavoured, with some success, to gain a market for electricity for heating purposes.

As to the domestic gas consumption, the gas-works meet with special difficulties in regard to houses without central heating; the heating requirements for cooking being obtained in connection with the heating of the kitchen itself, for which purpose coal or wood is used. Since the present state of things is such—and especially if there were reasons to fear that the future of the gas-works was seriously threatened—the undertakings ought to consider carefully what may be done in order to guard their interests and those of their consumers. The use of gas instead of solid fuels is of indisputable advantage to the general public, as well as to the individual; and the task of the undertakings is to supply the public with gas to as large an extent as possible. This effort, however, has been counteracted by the fact that the price of gas has been kept higher than necessary. From this point of view, the gas undertakings ought to supply gas at cost price; but this figure should include, among other things, a certain "risk interest" on the capital invested in the enterprise.

If we base our supposition on the fact that the undertakings in future will sell gas at cost price, or at any rate slightly above it, the question of gas rates, always of great importance to the concern, becomes still more so. As shown below, the cost price is not the same for all the gas supplied, but differs very much for the various consumers. If the gas, therefore, is supplied at a common price per therm or per 1000 c.ft., corresponding to the average cost price, and no other charge is made beyond that, this means that the gas undertaking supplies certain consumers with gas at a price more or less below cost, while the price for other consumers exceeds the cost. This might be justified if those groups of consumers who were thus paying too little could not be retained without this lower price, and if at the same time the other groups who were paying too much could be retained as consumers on account of their high appreciation of gas. The state of affairs is, however, rather the opposite.

Those groups of consumers who at a common rate equal to the cost price cause loss to the gas-works—and they constitute as a rule more than half the total number—are mainly certain domestic consumers, who generally consume but little gas, because they are also, and principally, using other fuels—for instance, wood or coal—for their cooking. To them the gas is very valuable, and results in a direct saving, because it is used

* Nearly all of the Swedish gas-works are municipally owned.

† In Sweden most of the electricity works generate current by water power. Further, the electricity works belong to the municipality, and the same board are usually governing both the gas and the electricity works.

for occasional warming-up, cooking on a small scale for breakfast, coffee making, &c., for which the employment of solid fuels would be a waste of time, very dear, and exceedingly inconvenient. The groups of consumers, again, from whom the gas undertaking, at a common rate equal to the cost price, must recover the loss occasioned by the others, are in the main such consumers as are more difficult to win, on account of the fact that, in these special domains, other fuels may be utilized to greater advantage. To these groups belong also the big households, where we have to fear the greatest competition from the electrical works. A common price, therefore, means a reduced gas consumption within those domains where the gas-works would otherwise have had a chance of finding a larger market, and may in many cases prevent the introduction of gas. For these reasons, it is of the greatest importance that gas should be supplied to different groups of consumers at various prices, in accordance with the cost price in each particular case.

Costs Dependent on the Number of Consumers.

The cost price of the gas would obviously be lowest if all the gas could be sold to one single consumer, who would receive it close to the gas-works, and in equal quantities per time unit during the whole year. It is thus evident that the cost price depends on a number of factors—especially the number of consumers, the place of consumption, the time of year or day when the gas is consumed, and the uniformity of consumption. It is possible that gas undertakings will be obliged in future to make allowance in their rates for a number of these factors, and even others—particularly the valuation of the gas by the various consumers. Here, however, we shall only touch upon the most important factor for the present—viz., the number of consumers. Those costs which are dependent on the number of consumers, and which will be dealt with later on in this communication, are alike for each consumer, and independent of his consumption of gas. They ought therefore to be imposed in the form of a fixed annual charge to all alike. The remaining costs may be considered as equally divided over the total quantity of gas consumed, and as being covered in the same price for each therm. If, for instance, the first-mentioned costs are supposed to be 14s. per consumer a year, and the latter 9d. per therm, each consumer ought to pay first an annual sum of 14s., and secondly a consumption price of 9d. per therm. If, further, the average consumption per consumer is presumed to be 72 therms per annum, the average cost per annum for each consumer is £3 6s. 8d., which corresponds to 11·1d. per therm. Under these suppositions, the introduction of the fixed rate per consumer thus brings about a reduction in the consumption price of 2·1d. per therm—*i.e.*, about 20 p.ct.

Among the consumers there is a small number for whom the value of the gas is not so great that they would be willing to pay a fixed sum of 14s. per annum. The gas undertaking will evidently lose these consumers; but they would be no real loss, either to the gas-works or to the public. For a greater number of consumers the gas, after the introduction of such a fixed rate, or service charge, will be dearer than if sold at a common price, on account of their small consumption. That the consumption is slight depends on small requirements or on the fact that other fuels are used besides gas. In both cases the gas is so valuable, on account of its convenience and other advantages, that the consumers will continue to use it, in spite of the greater expense. In households where gas alone is employed for cooking, it becomes still cheaper with the proposed division of the costs than at a common price; and even for the big consumers the division ought to be advantageous, although the latter as a rule are already favoured by means of rebates.

It is, of course, a great advantage to the gas undertaking to be able to recover from each consumer the costs incurred for him, even if he is consuming very little gas or practically none at all. Where gas is used besides other fuels, or perhaps only as a reserve, the gas-works are compensated for the cost of keeping the gas in readiness for the consumers. The lower consumption price makes it possible for the undertaking to secure certain consumers who would otherwise be out of reach. By means of the lower competitive price, too, gas could be used for new requirements by consumers who now utilize it only for certain purposes.

In speaking of a fixed rate per consumer, we have supposed—and this is generally the case—that each consumer has only one meter. By rights a fixed rate ought to be charged for every meter, because the costs are rather in proportion to the number of meters than to the number of consumers. How the costs of the undertaking are to be divided per meter or per therm of gas supplied cannot, of course, be exactly determined; and as regards certain costs there may be different opinions prevailing. It is, however, evident that raw material, labour, and other costs for the production of the gas, and the capital cost of the manufacturing plant, are to be divided per therm. To this are also to be referred certain common costs as, for instance, taxes and pension expenses. To the capital cost of the meters has to be added the expense of installation and removal, care and adjustment of the meters, reading, billing and book-keeping, collecting, and the like. These costs include wages and materials of all kinds, as well as the amount of rent. Allowance must be made for interest and amortization of the meters as well as of the meter repair shops, &c.

Management costs could be based on the number of meters or per therm, or with a certain amount on one or the other of these groups. If, therefore, we suppose—and for this there are certain reasons, as will be shown later—that no other costs are to be reckoned for the meters than those that increase with the number of meters, all costs for the management, or the largest part of them, ought to be charged on the gas consumption.

As to the gas mains, their extension is dependent on the number of consumers, while the capacity is regulated by the consumption. From this point of view the greater part of the cost for mains ought to be charged on the consumers. However, the cost is not the same for each consumer, but depends on the length of mains to the place where the gas is consumed. If a number of consumers in a new villa neighbourhood are to be supplied with gas, the mains required will be very expensive in proportion to the consumption expected. It would be difficult to base these either on the number of consumers or per therm. They should therefore be paid in another way—for instance, by the estate owner in the form of an amount paid once for all and equal to the whole cost price or the greater part of it. If a new consumer is connected with the existing mains, for instance in a densely populated part of a town, no direct costs are incurred by the gas undertaking—at least not immediately. Only a small portion of the cost for the mains should therefore be laid on the individual consumer.

From the above it will be gathered that the part of the costs based on the number of consumers may vary within rather wide limits. As the desideratum is to determine a fixed rate corresponding to practical requirements, we must also take into consideration other points of view when evaluating it. As mentioned before, the gas undertaking must reckon on the loss of certain consumers when the fixed rate is introduced; and it is evident that the number of these increases in proportion as the fixed rates are raised. However, it is in the interest of the undertaking not to lose valuable consumers. It may be assumed that management costs are not at all, or but slightly, reduced if the number of consumers falls off. The same thing applies to the mains. If the costs of these have been calculated too high in the fixed rate, the undertaking will consequently run the risk of losing through the falling-off of consumers. It is therefore advisable that costs should not be included in the fixed rate which are heavier than those absolutely necessary.

As regards the practical application of such a tariff, consisting of a fixed rate and an addition based on consumption, it need only be mentioned that the charge of a certain amount for each consumer for the consumption and the meter reading will cause the undertaking no additional costs worth mentioning.

Conclusion.

On account of the competition the industry has to meet, and in order to supply as many of the inhabitants of the town as possible with gas, it is of importance that charges for gas should be low, and profits kept as small as possible. As the cost price is different for the gas supplied to different consumers, a common price equal to the cost price is a loss to the undertaking on more than half of the total number of consumers. This is wrong, as those groups of consumers who are thus paying too low a price are in the main those who set a high value on the gas, while within those groups who are paying too high a price the competition from other fuels is often greatest. A common charge therefore means less consumption than would be the case with one better adjusted to the cost price. A large portion of the costs of the undertaking is directly dependent on the number of consumers or meters. These costs therefore ought to be paid in the form of an annual rate alike for all, whereby the charge for consumption paid in addition to this will be considerably lower than that debited at a common price. Those costs covered by the fixed rates are independent of the gas consumption, and for each consumer, practically speaking, are equal. The fixed rate should not be placed so high as to cause the undertaking to suffer loss of money by losing consumers.

Discussion.

Mr. RANDEL (Manager of the Municipal Gas and Electricity Works of Landskrona) said that on most points he agreed with the opinions expressed by Mr. Molin and Mr. Blomquist. The variation of the cost price per therm was no doubt greater than that of the fixed cost, because the cost price depended on the state of the market. When determining the fixed cost, however, they should not only take into consideration the costs which fell off when the existing number of consumers was decreased at the introduction of the fixed rate, but should rather base their calculation on the increase of the cost which would arise if, for instance, a new quarter of the town were to be supplied with gas. It must be remembered that the consumption of the smaller consumers was a very small portion of the total consumption, and the eventual loss of these consumers would probably be compensated by the gaining of a few larger consumers by changing the tariff into a fixed rate and a price per therm considerably lower than that of the common rate. If, for instance, they supposed that all consumers with an annual consumption of 9 therms or less would fall off at the introduction of this rate, this would mean a loss for them, based on the figures for 1923, of 318 consumers with a total consumption of 1125 therms. If the price of gas was 1s. 1½d. per therm, this implied that the gross receipts were reduced by £63. It was obvious that such a loss was of no importance to the economy of the gas-works. However, he believed they need not fear even this loss of consumers at the intro-

Social Position.	Number of Consumers.	Gas Consumption per Family.	Exclusively Gas.		Gas and Wood.		Number of Consumers having Central Heating in the Kitchen.	Number of Consumers Baking.	Number of Consumers Using Special Apparatus for Baking.
			Number of Families.	Therms per Family.	Number of Families.	Therms per Family.			
	P.Ct.	Therms.	P.Ct.		P.Ct.		P.Ct.	P.Ct.	P.Ct.
Considered poor	14	18	2	17·5	12	18·2	·0	1·1	11·5
Considered not poor . .	84	18·9	25	14·8	59	20·7	5·5	12·1	26·5
Social position unknown .	2	..	..	..	..	..	..	..	..

duction of a fixed rate of 17s. to 22s. If, however, they based their supposition on the fact that the undertaking would lose all consumers using up to 18 therms per annum, what would be the result? In 1923 they had 733 consumers belonging to this group—*i.e.*, 15 p.ct. of the total number—and the consumption of these was 6770 therms, or 2·74 p.ct. of the total consumption. If these were lost as consumers, the reduction in the gross receipts per annum would be about £380 with a common price of 1s. 1½d. per therm. Even this was an inconsiderable amount. He therefore considered that there was no economic risk in the undertaking dividing the rate as above mentioned. On the contrary, it would no doubt be advantageous. The difficulty was not there, but entirely in the political domain. The general public had a preconceived idea that they should not pay the meter rent, and that it was an injustice to the poor that large consumers should have the gas cheaper. People thought that nothing but distribution costs should be included in the common price per therm. To some extent this was the fault of the undertakings, because they ought to have informed the public in this respect.

Mr. VON SYDOW (Manager of the Municipal Gas and Electricity Works of Orebro) remarked that it was self-evident that the larger concerns must obtain different figures than the smaller ones. In Malmö, for instance, the cost price of the gas was 12s. 4½d. per consumer *plus* 6½d. per therm, while the figures for Orebro were 22s. 2½d. *plus* 7½d. per therm. After the cost price had been calculated, the question arose as to how the rate itself was to be formed. The rate should not only cover the net costs, but also the profit, as well as the costs for the renewal of meters, the extending of the mains, &c. As regards Orebro, if he based his supposition on a fixed rate of 22s. 2½d. and took the revenue account for 1924, he obtained a rate of 22s. 2½d. per consumer and 11¼d. per therm. This rate would give on an average the same result as a price of 1s. 3d. per therm. If he continued to calculate in this way, he found, when comparing this new rate with the present fixed price of 1s. 3d. per therm, that this price became as dear as 22s. 2½d. *plus* 11¼d. per therm at a consumption of 71⅓ therms per annum. He had investigated the annual consumption of the individual consumers, and had arrived at the result that there were few consumers who used over 71⅓ therms per annum. More than 85 p.ct. consumed less than 71⅓ therms. There would only be a relatively small portion of consumers left who could use this combined rate to advantage. On a previous occasion he had informed his Board of Directors of some of these figures. The reception was not encouraging. One of the members said that he could not understand what the new rate was good for, as it only favoured the larger consumers. The fact was that the question was a social one. Another member of the Board, a Manager of a large mill, said: "As long as the gas-works give a surplus, and as consequently the introduction of this new rate means an indirect taxation, I for my part cannot find any reasons for any change in the rate, by means of which the large consumers should get a cheaper price. What we lose by greater expense for gas, we get back, at least to some extent, by paying lower taxes." At their electricity works they had introduced a minimum rate of £1 7s. 9½d. per annum for consumers of lighting, and this had not been considered unreasonable. It would not, however, be easy to apply this to gas. Gas was of greater importance than electricity for the economy of the consumers. If they decided upon the combined rate, it was very important that they should agree how the costs were to be divided. It was desirable that the calculations of the cost price should be made on the same basis for all undertakings. It would be an advantage to be able to declare that the Swedish Gas-Works Association considered that the costs should be divided in a definite way. He had taken up another question allied to this—that of a suitable rate for bakers. For the present the question was before the Town Council. The Board of Directors had asked, if the undertaking got new large consumers, not to be bound by fixed rates, but to be allowed to act by way of trial. They had made some experiments in a bakery in Orebro, and had found that the bakers could pay 1s. 0¾d. per therm without increasing their working expenses. At present it seemed, at least to him, that the best thing would be to leave the boards of directors at liberty to act experimentally. The Finance Committee, however, did not agree to this, but were of opinion that all consumers who took a certain quantity of gas, irrespective of the purpose for which the gas was used, should be entitled to the same rate. For the present the matter was awaiting calculation of the budget for the next year.

Mr. SAHLBERG (Manager of the Municipal Gas-Works of Helsingfors, Finland) thought it would be of interest to the Association to hear that a year ago the Helsingfors gas undertaking had introduced a rate which might be said to have the same purpose as the fixed rate. This took the form of a meter rent, which was collected once a year and which was debited in accordance with a table made up for various sizes of meters and different annual consumptions. This meter rent was only charged on the very smallest consumers, while consumers with a normal consumption did not pay. The table mentioned would be published in the annual report of their gas-works for 1924. It might be expected that a number of small consumers would abandon gas; but in general this had not been the case. People generally paid the meter rent. It was also expected that the Town Council would raise objections to the introduction of this rent, but the gas consumption at that time was increasing so much that the grant for the purchase of meters was nearly at an end. Consequently it was necessary either to consent to an increased grant or to take away the meters from such consumers as at the time had no consumption or only a very small one. The rent, which had been introduced in April, 1924, had yielded over £200 until the end of the year—*i.e.*, during eight months. The income from the gas during the same year was about £40,000. This rent, of course, was no fixed rate, but though it would be difficult to get such a rate accepted, it was a step in the right direction.

Mr. DANIELSON (Engineer at the Municipal Gas-Works of Stockholm) said that at the Stockholm Gas-Works they had recently made an investigation (which, however, was not yet completed) regarding the social position of the small consumers. They had tried to state whether or not the consumer was poor. Part of the results could be seen from the [above] table. It was, however, difficult to draw definite conclusions from it.

Mr. DAHLANDER (General Manager of the Municipal Gas and Electricity Works of Stockholm) remarked that in Stockholm they had had for some time well-regulated meter rents, by means of which the rate followed the cost price. On one occasion, more than twenty years ago, when the budget for the following year was dealt with by the Town Council, it was decided, on account of a proposal which was brought forward during the discussion, to strike out the item of the meter rents, without making any previous investigations. On account of this resolution a large number of such consumers were obtained, who occasioned losses to the undertaking. After a few years the matter was re-discussed, and meter rents were re-introduced. They had prevented request for meters out of pure mischief, and also had given some small compensation for the losses on the very small consumers. The simplest way, therefore, seemed to be to increase the meter rent to such an amount that it would correspond as nearly as possible to the fixed costs. With regard to the smaller consumers, statistics for Stockholm showed, as explained by Mr. Danielson, that the greater portion of the same were rather well-to-do people. He therefore considered that the result of the investigation indicated that, instead of introducing two rates, one single rate, together with a meter rent, should be brought about which would cover the costs for the meters, &c., as nearly as possible.

Mr. RANDEL did not think it possible to lay down any definite rules for the division of the costs. They had two rates in Landskrona, but he was not sure that this was correct. These rates had only been introduced in order to get the combined rate accepted. He might point out that even by the common rate they got a guaranteed annual sum of 13s. 4d. per consumer. This amount had been fixed without any calculations. It had simply been decided that the same should be equal to the amount of the guarantee paid for electric lighting.

The Board of the Association proposed that the following declaration should be made:

> As a principle, gas tariffs should be based on the costs for the production and distribution of the gas, and consequently they should consist of a fixed rate per consumer and a special price for the consumption.

This declaration was also accepted as the unanimous resolution of the Association.

[NOTE: Regarding the contributions to the discussion by Mr. Randel and Mr. Dahlander, Mr. Blomquist states that certain of their remarks will be better understood if it is mentioned that in Landskrona and Malmo two different rates are in operation: (1) A service charge per consumer *plus* a price per 1000 c.ft.; (2) a common price per 1000 c.ft. The consumers have the option of coming under either of these rates.]

Lead Filings for Pipe Joints.—It is reported by the "American Gas Association Monthly" that a heating contractor recently informed the United States Bureau of Standards that he had found lead filings taken from an ordinary lead pipe by a coarse rasp, and sprinkled on to the threads of a pipe joint (being held on, while screwing-up the joint, by the cutting oil used or by the ordinary white or red lead joint paste), to give a tighter joint than the paste. The lead alone without any paste was said to be satisfactory; and such joints were claimed not to stick and be difficult to unscrew, as is the case with old joints on which the paste has been used. The Bureau, to try-out the suggestion, made up a few joints, and tested them for tightness. While half of the joints made with paste leaked below 8500 lbs. per sq. in., those made with lead filings alone uniformly withstood this pressure without leaking.

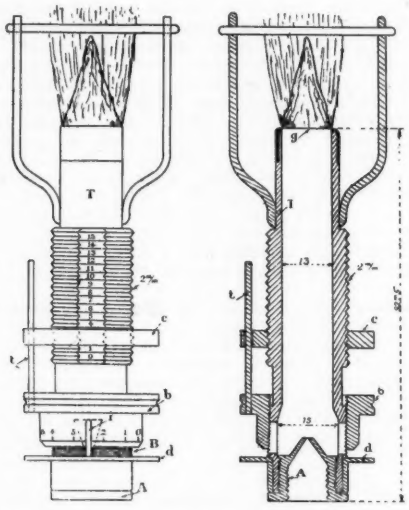
CONTROL OF GAS MAKING.

By M. CH. DESCHAMPS.

[From a Paper read at the Meeting of the Société Technique.]

An apparatus is described which has been in use for several years, and which, it is claimed, shows at a glance, at any moment, and with quite sufficient accuracy, the calorific value of the gas which is being produced. It is, to be exact, a "comburimeter," but its comburimetric readings can be converted into calorific with an error negligible for the purpose of running tests.

The apparatus takes the form of a burner, which consists essentially of a single-orifice injector A, a mixing chamber B, an extension tube T, and a recording screw. The mixing chamber has air-inlets of a form which has been devised especially with the object of giving to the apparatus an almost constant sensitiveness whatever may be the quality of the gas. The size of the orifices is regulated by a ring *b*, which turns on a screw of 0·5 mm. thread. The tube T has at the top end a gauze *g*, and, held by two supports, at a distance of about 25 mm. above it, a magnesia rod. The regulation of the air inlets can be effected easily and with accuracy, owing to the fineness of the screw thread, and the degree of aeration is measured by the number of turns of the ring *b* above its lowest position. This is mechanically recorded by the following means: The tube T has 2-mm. screw threading, on which works a disc C. By means of a rod *t*, this disc is made to follow the rotary movement of the ring *b*. Every time the latter makes one revolution on its 5/10-mm. threading, the runner C makes one on its 2-mm. threading, and is thus raised a distance of 2 mm. On a flattened surface of the burner tube a numerical scale is marked, which thus shows at a glance the complete revolutions made by the ring *b*, while a circular graduation of the ring itself gives the tenths of a revolution from the index I which is carried by a disc *d*.



In whatever way the burner is employed—either as indicator, "comburimeter," or calorimeter—the same pressure should be used, and it is best to keep it fairly high (80 mm., for example).

To use it merely as an indicator of running conditions, the air inlets are so regulated that the point of the interior cone of the flame just touches the magnesia rod. If at any time it is observed that the point of the blue cone is lower, while the rod remains perfectly incandescent, then it is clear that the quality of the gas has deteriorated. The quantity of air admitted has, in effect, become too great in relation to the combustion value, resulting in a shortening of the flame. The reverse case is when the point of the cone is raised, and there is a dark spot on the magnesia rod.

To use the apparatus as a "comburimeter" or calorimeter, the air orifices are set as before, and the complete revolutions and tenths are read off on the scales. A number is thus obtained—say, for example, 4·25—which corresponds to a predetermined combustion value, or, as a matter of fact, an equivalent calorific value, if a slight error be accepted, which is negligible for practical working tests. A table of corresponding values, once made, enables values to be determined afterwards by simply reading off the numbers on the scales.

Upon the supposition that any given combustion value has always a corresponding constant density and constant rate of flame propagation, it must be admitted that, in any given burner, with constant gas pressure, temperatures, and hygrometric degrees, a gas of combustion value C always requires the same degree of aeration to produce the same height of cone. Upon this is based the principle of the apparatus, and the table of corresponding values between combustion values and degree of aeration. To judge of its practical value (as a "comburimeter"), it is necessary to investigate the importance of any possible errors due to variations in the density and in the rate of propagation of a flame of constant combustion value on the one hand, and to variations in temperatures and hygrometric degrees of the air and the gas on the other.

The two former were considered the most likely to interfere with the accuracy of the instrument, but calculation and experiment alike have proved that their influence is not great. For example, a drop of 1 p.ct. in the density of the gas gives rise to an increase of approximately 0·5 p.ct. in gas volume, and of 0·1 p.ct. in the volume of air-gas mixture supplied to the burner. But the weight of air taken in remains constant, and, as the temperature does not vary, the volume is constant also, so that the proportion volume of air drawn in to volume of air required is reduced by about 0·5 p.ct. This reduction, and the increase of 0·1 p.ct. in the total volume supplied, will alter the length of cone inappreciably, and by an amount unobservable by the eye.

The experiments of Prof. Chappuis on the influence of carbon monoxide on the rate of flame propagation show that the rate varies by about 20 p.ct. between a CO content of 7 p.ct. and 18 p.ct. This increase from 7 to 18 p.ct. is not possible unless accompanied by a variation in combustion value of more than 20 p.ct. But, at constant combustion values, variations in composition so considerable as this are hardly possible, especially when dealing with gases of the same nature, so that it is highly improbable that variations in the rate of flame propagation due to differences in composition at constant combustion value can appreciably affect the accuracy of the instrument when used as a "comburimeter." So it may be assumed that its accuracy for this purpose can be sufficiently relied upon, if temperatures and hygrometric degrees vary little or not at all.

Variations in these do, however, exercise an influence which cannot be overlooked, and it has not been thought possible to devise a simple correction factor for each instrument which would meet all cases. It is thought preferable to determine experimentally what correction is necessary every time that atmospheric conditions alter to any marked extent. This can easily be done by means of an ordinary calorimeter, and it is pointed out that in any case the apparatus is only intended as a useful auxiliary to, and not a substitute for, the calorimeters ordinarily in use.

The paper then proceeds to demonstrate, by means of a series of graphs, in what way the conclusion was arrived at that it is always possible to draw up a table giving, within the limits of ordinary working requirements, the calorific value of the gas in terms of its combustion value, and, therefore, in terms of the air admitted to the burner described. Careful comparative tests made over a period showed that 65 p.ct. of the tests gave calorific value results of less than 50 calories error, and 35 p.ct. between 50 and 75 calories error [1 cal. per cub. m. = 0·1124 B.Th.U. per c.ft.]

A simple modification of the burner has been devised which rings an alarm bell, and so attracts the attention of the staff, in the event of any exceptional drop in the calorific value of the gas during the process of manufacture.

Gas in the Making of Lenses.

The lens department of the Standard Optical Company, in Geneva (N.Y.), is, according to the "Empire News," an example of a modern plant which uses gas-fired apparatus to advantage in securing both quantity and quality of output. Rough squares of glass take shape as they pass through this plant, and finally emerge, ground and polished, ready for the opticians, who fit them to the individual needs of people. Raw material comes into the factory in the form of these squares, of varying thicknesses, and about 1½ in. side. The first operation takes place in the moulding ovens, which are gas-fired. Intense heat is necessary in these ovens to melt the glass, so that it may be pressed into shape for the lenses. The glass squares are placed in shallow iron moulds, and the moulds are put in the ovens, where temperatures of from 1800° to 1900° Fahr. are maintained. When the glass has melted at this high temperature, the moulds are withdrawn, and the lenses are forced into shape in a press which is attached to the moulding ovens. The roughly shaped lenses are then placed in wire baskets, and put back in a warming oven located just over the moulding oven. Four double rows of these moulding ovens are heated by gas in the Standard plant. Operators stand in front of the ovens, protected from the terrific heat by asbestos shields; and they watch the moulds in the ovens through small glass windows in the shields. When the baskets in the warming ovens have been filled, the lenses are put through the annealing oven, technically called a glass lehr. This is done to anneal the glass, so that it will not be too brittle to handle when it cools. The lenses go into the lehr at a temperature of 1000° Fahr., and after twelve hours come out cool enough to handle. An endless belt, which moves so slowly that its progress is not noticeable, carries the baskets through the lehr. Gas furnishes the heat in the lehr; and because gas gives a heat which is unvarying and can be postively controlled, it is admirably adapted to this work.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Dr. Carpenter and the Reduction of Costs.

SIR,—Dr. Carpenter in his cross-examination by Mr. Charteris before the House of Lords Committee on the 14th inst. stated that:

The South Metropolitan Gas Company have been steadily reducing their costs by working more economically and scientifically since 1920, and that this did not apply equally to other companies.

It did not apply to the Sheffield Company.

It did not apply to the Gas Light and Coke Company.

The figures for the actual total cost of gas, less residuals, per therm, as taken from Field's Analysis, are as follows:

—	Gas Light and Coke Company.	South Metropolitan Gas Company.
	Pence.	Pence.
1920	10·627	9·323
1924	7·509	7·686
Improvement in working . .	3·118	1·637

Not only have the Gas Light and Coke Company improved their working results to the extent of nearly double the improvement effected by the South Metropolitan Gas Company since 1920, but they showed last year better working results than that Company.

I am constrained to draw attention to this matter, not on account of the inaccuracy of his statements, but because Dr. Carpenter emphasized his claim to special efficiency by throwing discredit on the carbonizing ability of other undertakings, in his further statement: "They do not understand the problem of carbonizing; they have not studied it; they do not know it." I beg to offer a most emphatic protest against this statement, as being not only completely untrue, but also a serious and gratuitous affront offered to the Engineering and Chemical Staff of this and other undertakings.

Perhaps Dr. Carpenter may some day extend his horizon enough to allow his sight to dwell beyond the all-sufficiency of his own Company, and realize that, while it has been progressing, others have not been altogether standing still.

T. HARDIE,
Chief Engineer.

Gas Light and Coke Company,
Horseferry Road, S.W.,
July 21, 1925.

Heat Value of Electrical Unit.

SIR,—I regret to find that an error crept into my letter published in your issue dated July 8, under the heading "Potential Heat Value of the Electrical Unit."

The figure used by the Institution of Electrical Engineers for expressing the thermal equivalent of a unit of electricity is 3412 B.Th.U. —not 3411 B.Th.U.

British Commercial Gas Association,
28, *Grosvenor Gardens,*
Victoria, S.W. 1,
July 14, 1925.

J. C. WALKER, Secretary.

Uckfield Gas and Electricity Bill.

SIR,—I notice in your report on the proceedings on the Uckfield Bill [see p. 180] that, owing no doubt to the inevitable condensation of my remarks, you attribute a statement to me very much more sweeping than that actually made.

My statement as to the price of coal was limited to works of a size comparable with Uckfield, and to coal of a particular quality and kind; while the statement of the price as "not less than 40s." should be "not much less than 40s."

ARTHUR VALON.

5, *Victoria Street, Westminster,*
July 17, 1925.

Bitumen v. Tar.

SIR,—I have followed with some interest the recent correspondence in the columns of your paper on "Tar *v.* Bitumen," and shall be glad if you can find space for the opinion on the subject of one who has no interest, financial or otherwise, in the production of either of these materials, but who looks at the matter purely from the point of view of the ordinary motorist.

It is, I believe, your contention that, since tar is a British product and bitumen is not, therefore the former should be used for road work, and not the latter. The sentiment is excellent; but I suggest that you entirely overlook the main point of the whole matter. A very large proportion of the cost of road construction, improvement, and repair falls upon the motorist, either by way of the extortionate special taxation imposed upon him, or by way of local rates. This being so, he is entitled to expect value for his money. The question of importance to him is, not the source of the material used, but its price and its qualities as a surfacing agent.

I am not prepared to say definitely that bitumen is better than tar for road repairs; but it does not seem (judging from many years' road experience) to be any worse, and in this case it is to the direct advantage of the motoring public that the cheapest material should be used. Further, if it should prove that a bitumen-surfaced road is more durable—*i.e.*, less inclined to become pot-holed and "wavy" under heavy wear—than a tarred road, it would be better from the motorist's standpoint to use the foreign material, even if a little more costly than tar, since the extra first cost would be offset by the longer life, and there would be in addition a great gain in "amenity" through less repair work being necessary.

It is from this standpoint that the problem, in my submission, should be approached. After all, the money spent on the roads is, or should be, used to provide the best roads possible, and not be employed for the purpose of bolstering-up some particular branch of industry that happens to be suffering a loss of profits.

In any case, I am afraid that the tar interests have, in some instances, at any rate, only themselves to thank for the switch-over from tar to bitumen. Much of the road upkeep in country places falls on the rural councils, who obtain, or used to obtain, tar from the small local gas-works, the price charged being as a rule very high. I am aware of at least one instance in which a road authority have changed-over to bitumen simply through the excessive price charged for crude tar by the local gas company, who have thereby, by their short-sighted policy, lost a good customer.

July 16, 1925.

MOTORIST.

REGISTER OF PATENTS.

Manufacture of Water Gas.—No. 235,427.

HOLDEN, T. F., of Washington.

No. 20,824; Sept. 3, 1924.

This invention relates to apparatus for the manufacture of water gas consisting of a generator, carburettor, and superheater. The carburettor is provided with an upstanding wall in its upper portion arranged to form a primary mixing chamber into which the oil is sprayed, and around which gas entering the carburettor is constrained to pass before admittance to the chamber for admixture with the vaporized oil therein. An economizing chamber is provided at one side of the carburettor for the purpose of thoroughly heating the water gas which passes from the generator to the mixing chamber. The walls of this chamber are comparatively thick, and are well lined with refractory material, thereby guarding against chilling of the gas in its passage therethrough. An inlet is provided for gas from a separate source.

The patentee states that some advantages of the apparatus are that any grade of generator fuel of reasonable standard, such as anthracite coal, oven, chamber, or retort coke, and bituminous coal of low sulphur content, may be used effectively; the capacity as compared with the usual construction of water gas plant is materially increased, while excessive accumulation of tarry waste is eliminated, and formation of lamp black is reduced to a minimum.

No. 235,428.

No. 20,825; Sept. 3, 1924.

This patent relates to the method of working the plant outlined in the above abstract of Patent No. 235,427; the main deviation from usual practice being the passing of the gas through what the inventor terms an economizing chamber, before it reaches the carburettor. It is well known, states the patentee, that water gas made from bituminous coal is of superior quality to that made from anthracite coal or any form of coke. The greatest detriment to its use is the liability of its clouding or fouling the passage between the checker-work in the carburettor and superheater. This liability is removed, it is claimed, by the improved arrangement of the checker-work construction.

When using bituminous coal, the latter is charged into the generator either by hand or by machinery immediately before making a down run. By this method, the volume of steam picks up the fine or light particles of the bituminous coal, forces and carries them down and through the live fuel bed, and gasifies this coal in such a complete manner as to remove the possibility of a smoke nuisance when the water gas is purged out after that particular run of gas. The inventor claims that, by injecting into the economizing chamber coal gas of low calorific value, more thorough blending of the gases results, and an increased volume of non-stratifiable and non-condensable gas is obtained.

Sulphate of Ammonia.—No. 235,613.

THE CHEMICAL ENGINEERING & WILTON'S PATENT FURNACE COMPANY, WILTON, T. H., and WILTON, N., all of Victoria Street, S.W. 1.

No. 4397; Feb. 20, 1924.

This invention relates to the manufacture of sulphate of ammonia, and more particularly to processes for drying the salt and neutralizing, by ammonia or other suitable agent, the free acid contained therein.

The damp salt is fed from a hopper on to a conveyor, and during its journey on the conveyor it is dried and neutralized. The conveyor may be adapted to discharge the salt into bags or deposit it in a heap or feed it into a separate drying machine. The conveyor comprises a closed trough or chamber along which the salt is moved by an endless chain, band, or belt, perforated or otherwise, and provided with slats. The moisture may be partially removed by an exhaust fan or pump, or it may be extracted by hot air passed over or through the layer of the salt. The conveyor is adapted to be heated for a part or the whole of its length by steam introduced by means of a jacket or row of steam pipes at the bottom of the trough, or by hot gases; and ammonia or other suitable agent, including soda ash and ammonium carbonate, dry or in solution, is passed along the conveyor for a part or the whole of its length. Means may be provided for agitating the salt during the process of drying.

In one form of apparatus the excess water is drained off as it passes along the first length of the conveyor; the extraction being

facilitated by exhaust pumps. The neutralizing agent is admitted to the conveyor for a portion of its length, and drawn off by an exhaust pump. The conveyor is provided with flues or pipes for conveying hot gas or steam for the purpose of heating the salt as it travels along the conveyor.

In another form of apparatus the closed trough or chamber is provided with a longitudinal flue disposed beneath the bottom, and adapted to convey steam or hot gas; the neutralizing agent being passed over the surface of the salt which is spread in a thin layer. The conveyor is sufficiently high to discharge into a sack or the like.

Carburetted Water Gas.—No. 235,693.

WOODALL-DUCKHAM (1920), LTD., and RIDER, O., both of Grosvenor Gardens, S.W. 1.

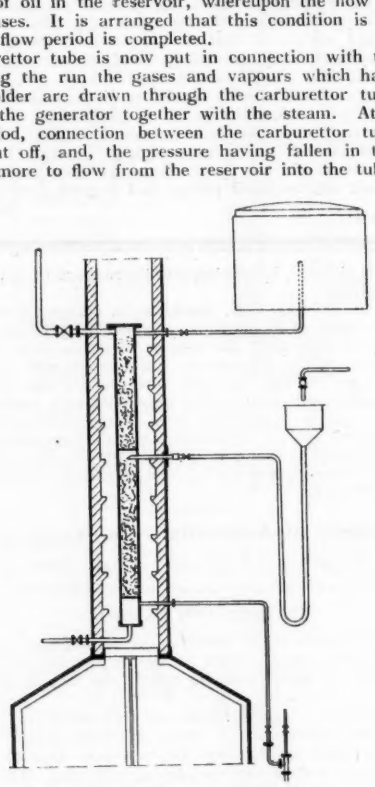
No. 12,208; May 17, 1924.

This invention relates to carburetting water gas; its main object being to obtain a better utilization of the oil used, by passing the products of the oil cracked in the carburettor into the generator together with the steam during the run period. Another object is to provide an apparatus which, by the construction and the consequent simplicity of its action, ensures satisfactory working under the control of unskilled and even careless operators. To this end the invention includes a carburettor connected with a gasholder, and so fed with the oil to be cracked that, when a certain pressure has been attained in the gasholder, the oil ceases to flow into the carburettor until the gases and vapours have been passed from the gasholder, preferably through the carburettor, into the generator during the run.

In one form of apparatus according to the invention (see the accompanying diagram) the carburettor comprises a tube placed vertically in the path of the hot blow gas leaving the generator and containing suitable packing material. The gas oil for carburetting runs continuously into a reservoir connected through a U-bend with the tube, preferably at about its middle point. At its upper part the tube is connected with a gasholder, and at its lower part with an injector which forces steam into the generator.

During the blow period the connections between the carburettor tube and the reservoir of oil on the one hand, and the gasholder on the other hand, are open, while that between the tube and the injector is closed. Oil flows into the carburettor under the head in the reservoir, and is cracked by the high temperature of the packing material and of the walls of the tube. The gases and vapours produced pass into the gasholder until the pressure in the latter is equal to the head of oil in the reservoir, whereupon the flow of oil from the latter ceases. It is arranged that this condition is attained by the time the flow period is completed.

The carburettor tube is now put in connection with the injector, so that during the run the gases and vapours which have collected in the gasholder are drawn through the carburettor tube and forwarded into the generator together with the steam. At the end of the run period, connection between the carburettor tube and the injector is cut off, and, the pressure having fallen in the tube, oil begins once more to flow from the reservoir into the tube.



A Woodall-Duckham Carburettor.

The carburettor tube is preferably placed in a chimney just above the cowl of the generator. This chimney may be lined with refractory material having projections directed towards the axis of the chimney, and adapted to absorb heat from the blow gas. Arrangements may be made for causing a draught of air through the tube at suitable intervals, for burning carbonaceous deposit on the packing material.

The gases and vapours pass again through the carburettor on their way from the gasholder to the injector, so that there is further opportunity for uncracked gases or vapours that may have entered the gasholder to become cracked before they enter the generator.

Drying Coals.—No. 235,627.

ILLINGWORTH, S. R., of Radyr, and the ILLINGWORTH CARBONIZATION COMPANY, LTD., of Manchester.

No. 6835; March 17, 1924.

In the usual coke oven practice, state the patentees, coal is first washed to remove dirt, after which it is either allowed to drain in bunkers or is treated in a centrifugal machine. In either case the water content is usually reduced to about 10 p.ct. In order, however, to get the best results, it is desirable to reduce the water content to about 3 p.ct.; and to effect this the coal is dried by heating to a temperature of 80° to 100° C. The dry coal in the heated state is liable to rapid oxidation, with consequent impairment of the coking property; and if the hot coal be stored even for short periods, there exists the danger of self-ignition.

According to this invention a part of the coal is heated, preferably out of contact with air, to a temperature of 300° to 400° C., and the heated part is mixed with the wet coal, whereby the heated part is cooled and the moisture in the wet coal is driven off. The part of the coal which is to be heated is raised to a temperature determined by the amount of water in the coal and the proportion in which the heated and wet parts of the coal are to be mixed. This temperature is around 300° to 400° C. where bituminous coals are preheated, but may be as low as 180° C. when different classes of coal are blended in definite amounts. It is preferable that the coal should be heated out of contact with air; and this is certainly the case when using bituminous coal. But when using some coals—for instance, non-coking coals containing less than 14 p.ct. of volatile matter, which are heated to a temperature below 400° C.—air need not necessarily be excluded.

The preheated coal *per se* must not be reduced in resinic content below preferably 5 p.ct.; for if this is done, the resultant blend with wet bituminous coals gives rise to a sandy coke, due to the non-fluxing of the preheated coal.

Pressure Wave Controllers.—No. 235,707.

EVERED & CO., LTD., and EVERED, S., both of Smethwick.

No. 13,823; June 6, 1924.

The invention consists of gas burner control mechanism of the pressure-wave type, characterized primarily by the arrangement of the valve which controls the bore in the body leading from the chamber to the outlet passage to the burner proper, and the valve which controls a bore leading from the chamber to the outlet to the by-pass or flash light, axially in line below the flexible diaphragm from which the valves are suspended by a common rod or stem secured to the central point of the diaphragm. A secondary feature of the invention lies in the construction of the chamber and certain other parts of the mechanism.

Gravimetric Analysis of Gas.—No. 235,770.

HARTUNG, C. A., of Berlin.

No. 26,320; Nov. 4, 1924.

This invention is concerned with apparatus for determining automatically by gravimetric analysis the constituents of gas mixtures and for recording their quantities on a diagram. A stream of the gas is passed through a vessel filled with absorbent; the stream being maintained constant. Through the continuous absorption of even small quantities of gas the weight of the vessel increases appreciably. The increase is determined by a weighing device, on which the vessel acts, and the displacement of which may be recorded graphically. The increase in weight as indicated by the diagram in unit time and with a definite rate of flow gives the percentage of the absorbed constituent of the gas.

Geysers.—No. 235,799.

SMITH, T. H., and SMITH, C. H., both of Bristol.

No. 1558; April 17, 1924.

This invention has reference to geysers of the open type, and wherein the outer casing and all the inside parts are kept cool by a number of wires or strips of metal which attract the water in such a manner as to expose it to the direct action of the hot gases, and so that both are split up into such small proportions that high efficiency may be obtained. According to this invention, the outer casing consists of a single sheet of metal with a cone at the bottom to form a trough into which the heated water is collected; and this casing is kept cool by wires or strips which lie in close contact with it, so that the water will cling between the wires and the surface of the casing. The wires may be of any number and run spirally, and be of such a pitch that the water keeps the casing cool should the heater be fixed out of upright.

Parliamentary Intelligence and Miscellaneous News.—Page 235 follows the Institution Supplement.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Burnley Corporation and the Walsall Corporation Bills: Read a second time, and committed.

Bolton Corporation Bill: Read the third time, with the amendments, passed, and returned to the Commons.

Rochdale Corporation Bill: Returned from the Commons, agreed to, with amendments, which were considered and approved.

South Metropolitan Gas Bill: Reported from the Select Committee, without amendment.

Gas Regulation Act.

The drafts of Special Orders proposed to be made by the Board of Trade under Section 10 of the Act, on the applications of the Great Yarmouth Gas Company, Devizes Corporation, Great Driffield Urban District Council, and the Langley Mill and Heanor Gas Light and Coke Company, Ltd., were laid before the House and referred to the Special Orders Committee.

HOUSE OF COMMONS.

Progress of Bills.

Blackpool Improvement Bill: Reported, with amendments, from the Local Legislation Committee.

Rochdale Corporation Bill: Read the third time, and passed, with amendments.

Statutory Gas Companies (Electricity Supply Powers) Bill: Lords amendments considered, and agreed to.

SOUTH METROPOLITAN GAS BILL.

House of Lords Committee.—Monday, July 13.

(*Before Viscount* FITZALAN OF DERWENT (*Chairman*), *the* EARL OF LUCAN, *Lord* GLENTANAR, *Lord* CLANWILLIAM, *and Lord* PLUNKET.)

The purpose of the Bill is to empower the South Metropolitan Gas Company to make their equipment and their resources available to statutory gas companies whose areas of supply are adjacent to their own. See "JOURNAL" for Dec. 24 last (p. 842).

The promoters were represented by Mr. H. P. MACMILLAN, K.C., Sir LYNDEN MACASSEY, K.C., Mr. W. E. TYLDESLEY JONES, K.C., Mr. ROWAND HARKER, and Mr. F. G. WROTTESLEY. The London County Council, who asked that the basic price of the Company, fixed by Parliament in 1920, should be subject to revision by the Board of Trade under the Gas Regulation Act, were represented by the Hon. EVAN CHARTERIS, K.C., and Mr. JACQUES ABADY.

Mr. MACMILLAN commenced his opening statement with a brief account of the history of the Company and their present position, as he did when the Bill was before the House of Commons. He pointed out that the arrangement to make available to adjacent companies the equipment of the South Metropolitan Company, which was unrivalled, would be to the mutual advantage of those companies and of the public. The power to make agreements with those companies, however, was subject to certain limitations. In the first place, agreements could only be made with companies whose areas of supply were adjacent to that of the South Metropolitan Company. Secondly, any agreements proposed to be entered into were to be subject to the approval of the Board of Trade, and were to be intimated, with particulars, to the London County Council, who were to be entitled to make representations and to be heard by the Board of Trade. Intimation was also to be made to boroughs and county boroughs wholly or partially outside the area of the London County Council. There was a clause for the protection of the Port of London Authority in matters affecting navigation of the River Thames.

The opposition of the London County Council was not to the main proposal of the Bill, but related to the Company's present system of charging for gas. In 1920 the Company obtained an Act establishing the basic price and basic dividend principle. The Bill was opposed then by a considerable number of authorities; one of the points raised being that an opportunity should be given for the revision of the basic price, which was fixed at 11d. per therm. In consequence of that opposition, a clause was inserted in that Act imposing an obligation upon the Company to come to Parliament within five years, in order to give any authority interested an opportunity, if thought fit, to have the basic price revised. The present Bill afforded that opportunity. In the House of Commons, this session, the County Council had asked either that there should be inserted in the Bill a clause subjecting the basic price to revision by the Board of Trade under the terms of the Gas Regulation Act, or that the basic price of 11d. should be revised by Parliament then. Neither course was adopted; but there had been inserted in the Bill a clause by which the Company were obliged to promote a Bill, not later than the 1935 session of Parliament, giving an opportunity for the revision of the basic price. The House of Commons were satisfied that the basic price of 11d. was a proper price; the only anxiety being to afford an opportunity for Parliament to revise the price, and for any proper and legitimate critics of the price to come forward. On the present occasion, however, the London County Council were asking, not that the Committee should revise the basic price of 11d., but that they should insert in the Bill a clause subjecting the basic price to revision by the Board of Trade under the Gas Regulation Act. The Act of 1920 marked an interesting and important development of gas management and gas finance. Besides fixing the basic price at 11d., it fixed the basic dividend at 5 p.ct. on the capital issued before the passing of the Act, and 6 p.ct. on capital issued afterwards. No capital had since been issued, however; so that the basic dividend was 5 p.ct. Under this system the amount saved to the consumers by reason of the reduction of the price of gas below the basic price was calculated for any year or half-year; and a sum equivalent to one-third of that amount could then be divided equally between the shareholders and the employee co-partners. Thus, if the price were reduced below the basic price, three-quarters of the surplus profits went to the consumers by way of a reduction in price, and the other quarter was divided between the shareholders and co-partners, provided there was sufficient money to pay the shareholders' and co-partners' shares. It was an inducement to the shareholders and workers to supply at less than 11d. per therm.

The scheme had been in operation four or five years, and had worked satisfactorily, when tested from all points of view. The Company, throughout their history, had supplied gas at a cheaper rate than any other Metropolitan Company; and the period during which the basic price scheme had been in operation was no exception to the rule. The policy of the Company had been to keep down the price of gas, although the result might be that at the end of a year's trading the co-partners and shareholders received no benefit. He submitted that Parliament legislated wisely when fixing the basic price at 11d. per therm. The basic price should not lightly be interfered with. It was the pivot of the whole thing; and it was very undesirable that this pivot should be moved unless very good cause were shown. It was particularly undesirable where the interests of the employees were concerned. If the basic price were shifted about, the scheme would be deprived of its very object, which was not that the basic price should correspond from time to time with the actual market price of gas—because if it did there would never be any reward for the shareholders or co-partners—but that there should be a reasonable margin to allow them to participate.

It was difficult to see what public interest was served by the action of the London County Council. There was not a word suggesting default on the part of the Company. On the contrary, the Council had used the most flattering terms about the Company on every possible occasion. One was tempted to ask, therefore: "Why not leave well alone?" Any attempt to import the revision system of the Gas Regulation Act into the Company's Act of 1920 was entirely out of place; the outlook of the two Acts was entirely different. The Gas Regulation Act and the South Metropolitan Company's Act received Royal Assent on the same day. Therefore Parliament were satisfied that the Company should have their own code, notwithstanding opposition. The Company had always recognized the clause in the 1920 Act to mean that within five years the Company were to come to Parliament to have the basic price reviewed.

Another reason why the basic price should not be subject to revision from time to time was that if it were thought by investors that a possible increment of dividend above 5 p.ct. might at any moment be taken away, the credit of the Company would be at once affected. When the Bill was before the House of Commons, the Committee of that House had found that the basic price of 11d. per therm was justified. The only question before the present Committee was whether the revision provisions of the General Act should be applied; and to this the Company objected.

Tuesday, July 14.

Dr. *Charles Carpenter* (President of the Company) dealt with the development of gas legislation, and with the history of co-partnership, and the part played by the late Sir George Livesey in that connection. He said that, of 19,398 shareholders, 6775 were employees of the Company. In support of his statement that the Company had consistently supplied gas more cheaply than other Metropolitan companies, witness submitted tables contained in the report of the Select Committee on the Statutory Prices of Gas Undertakings, in 1918. They also showed that on fifteen occasions between 1880 and 1906 the Company had paid a dividend lower than they were entitled to pay, to avoid increasing the price of gas.

After a reference to the storage resources of the Company, in which he stated that during the coal strike of 1921 the Company had assisted 26 undertakings in the matter of coal, and 37 others by providing them with coke for making water gas, witness alluded to the position which had led to the promotion of the Company's Act of 1920. Despite the fact that the Company had not relaxed their efforts to do what they could in the public interest, in the broadest sense of the term, radical reorganization was necessary. The sliding-scale had broken down, owing to soaring prices, and the co-partners received no bonus. The co-partnership scheme then in operation was purely voluntary; and it was felt that it would be better to provide a scheme under which the employee would have a statutory right to his share. It was only proper, however, that the consumers should have the lion's share of reduced costs; and they were given three-quarters of the increased accumulation of profits. It had happened sometimes that, after the consumers had had their share, there was no money left with which to pay the shareholders and employee co-partners the share to which they were entitled; and they had received nothing.

The Company had in the past put forward novel schemes, which had afterwards become the usual and accepted practice throughout the kingdom; and the Marquis of Bristol, who presided over the House of Lords Committee who considered the 1920 Bill, stated that the Committee proposed to go on with the Bill, as it was in the public interest that they should do so. The London County Council and the Company had been on excellent terms; and he felt a little hurt that the Council should have tried, on the present occasion, to disturb the arrangement into which they had entered in 1920. He challenged the Council to give evidence to controvert his assertion that the present system had tended towards the supply of cheap gas. In the House of Commons this session the Council had attacked the basic price of 11d. per therm, but had put no witnesses forward to give evidence on the matter. If Parliament were to apply the provisions of the Gas Regulation Act to the Company, it would pro-

duce a feeling of insecurity among the shareholders and employees; and the last thing one wanted to do to-day was to increase the unsettled feeling among industrial workers.

The Hon. EVAN CHARTERIS, cross-examining, traced the history of gas legislation, to show the protection which Parliament had afforded gas consumers in the past.

Witness said that the real protection of the public was the fact that this was a public Company, in the full glare of the limelight, serving an enlightened public; and he considered it was possible to attach too much importance to the protection which had been afforded by Parliament in the past. Regulation to-day was not nearly so important as it was in 1875 or 1899.

Mr. CHARTERIS asked if it were suggested that the protection of the consumer which had been devised and continued by Parliament hitherto was not necessary.

Witness replied that it would be unfair to draw this inference; but restrictions were becoming less necessary, because there was a more potent regulation than that of Parliament—namely, the commercial regulation. The Company should be allowed to carry on with the charter granted them by Parliament in 1920. There was not a tittle of evidence that it had been abused.

It was then pointed out by Counsel that, during the proceedings on the 1920 Act, Counsel for the Company had expressed the Company's willingness to submit to revision by the Board of Trade; but Dr. Carpenter's reply was that Counsel had exceeded his instructions when he said that.

Witness agreed that under the sliding-scale the dividends were reduced if the price of gas were above the standard, but that under the basic price system the dividend was not reduced below the basic dividend if the selling price were increased. He pointed out, however, that, in order to prevent the dividend disappearing altogether under the sliding-scale system, as it had done in certain cases during the war, the standard price of a sliding-scale company was higher than the basic price of a basic price company. The South Metropolitan Company had always been able to supply at a lower price than other Metropolitan companies, due to good management. When it was suggested by Counsel that the Gas Regulation Act would not deprive the Company of the benefits of good management, he expressed the opinion that the effect of that Act was to sterilize gas undertakings, and to remove the incentive to improvement.

The next matter dealt with by Counsel was that Parliament had given power to apply the basic price and basic dividend principle to six other gas companies. These were Cardiff, Swansea, and Harrogate in 1921, and Sheffield, Windsor, and Chester in 1922. It had been refused to the Rhymney and Aber Valley Gas Company in 1922. In each of the six cases mentioned, however, the basic prices were subject to revision by the Board of Trade under the Gas Regulation Act. Further, the Bills before Parliament this session dealing with London's electricity supply established the basic price principle in the electricity supply industry for the first time; and there was provision for revision. Witness's reply was that in all probability super-electricity generating stations would be built, and it was thought that the result would be an enormous reduction in the price of electricity. In such circumstances as these, Parliament could not decide what the prices of electricity would be in the future. There was nothing on the horizon in the gas industry, however, which was comparable with that. Commenting on the Rhymney and Aber Gas Company's Bill, he pointed out that this was a special case, where the Company obtained the bulk of their gas from coke ovens, and distributed it. The gas industry could not be carried on economically very much longer if the managements were faced with the possibility of constant revision. The London County Council would never regulate the price of gas by the dividends paid. No matter what the dividend, his idea was to supply cheap gas.

Mr. CHARTERIS referred to evidence given on behalf of the Company in 1920, when Dr. Carpenter had suggested that the relation between the basic price and the actual price charged should be a close one. In 1924 the price was 8d. per therm, which was 3d. less than the basic price.

Mr. CHARTERIS: What I am asking you now is, do you consider that that relation between actual price and basic price should continue a close one?

Witness: In the interests of all concerned, we have been working five years under the Regulation Act. During those five years we have put into it all the strength of our engineering department, our physical department, our chemical department, all the possible research we could, and we have been steadily reducing our costs, working more economically and scientifically. Therefore to-day we have this advantage, that there is a greater difference between the prices to-day than there was in 1920, brought about by the operation of the 1920 Act.

Cannot that be said equally well of other companies?—No.

Not of the Sheffield Company?—No.

Not of the Gas Light and Coke Company?—No.

What is the special monopoly of ingenuity and efficiency that you claim?—They have got no laboratories worth the name. They do not understand the problem of carbonizing; they have not studied it; they do not know it.

That is your view?—Absolutely.

As to the question if he still adhered to the principle that there should be a close relation between the selling price and basic price, witness answered that they did not want to set-up a machine with nothing to do. If the basic price were altered when the Company appeared to be working a little better, the undertaking would be sterilized, and the machine prevented from functioning. When he had said that there should be a close relation between the prices, he had never meant it to apply for all time; it should apply when the machine was first put in operation. The present price was 8¾d. per therm. If the price were 10d. per therm, the dividend to which the shareholders would be entitled was £6 7s. p.ct.

Mr. CHARTERIS asked if it were seriously suggested that the basic price of 11d. should remain, irrespective of what rise or fall there might be in costs of production during the next ten years.

Witness said it was, and the Company were willing to take the risk. Having regard to all the circumstances of the past, the Company could be trusted in the next decade to do what they had done in the past.

Re-examined, Dr. Carpenter agreed that the Companies referred to as having obtained powers to apply the basic price principle had placed themselves voluntarily under the provisions of the Gas Regulation Act. With regard to the Rhymney and Aber Valley Gas Company's Bill of 1922, Lord Muir Mackenzie (Chairman of the Committee who dealt with it in the House of Lords) said the Committee were not prepared to rule-out on principle the basic dividend system, as though essentially inapplicable to any undertaking, but that, in the circumstances of the Rhymney Company, and in face of the strong opposition of the districts affected, the Committee were of opinion that it should not be applied in that case.

A table showing the standard prices and actual prices charged by the South Metropolitan Company, from 1876 to 1920, and the basic prices and actual prices since 1920, was then handed in. This showed that the margin between the two was higher, expressed as a percentage, under the sliding-scale than under the basic price system. Before 1920 the percentage varied up to as much as 39·3; whereas the highest percentage under the new system was 27·3, the selling price then being 8d. per therm.

In reply to the Committee, Dr. Carpenter said 10,301 consumers were shareholders in the Company, and held stock to the extent of £1,343,765.

Wednesday, July 15.

Sir *Herbert Hamblin* (ex-President of the Institute of Bankers, and Deputy-Chairman of Barclay's Bank, Ltd.) said that before the war the South Metropolitan Company's stock was one of the best, or perhaps the best, of the gas stocks. The 4 p.ct. stock then stood at 112 p.ct.; but the stock to-day stood at 92½ p.ct. After discussing the adverse effect of the war, he said that when Parliament authorized a basic dividend of 5 p.ct. in 1920, it had a material effect, and the Company were in a position to obtain money on far more favourable terms than was the case before the passing of the 1920 Act. Interference with the basic price would undoubtedly affect the stock, and make it a little more speculative; and it would be a great pity if the present basis were altered.

Cross-examined by Mr. ABADY, witness agreed that, assuming Parliament had made a mistake in fixing the basic price too high, a revision would injure no one. The yield of the South Metropolitan Company's stock was less than that of other gas undertakings; but it stood higher in the market, and he attributed this to the efficient management of the undertaking.

Mr. ABADY said that the yield to investors as between the stock of a characteristic standard price company, such as the Gas Light and Coke Company, and the South Metropolitan Company, varied from time to time. Sometimes it was in favour of one, and sometimes in favour of the other.

Witness replied that he could not check the figures; but the stock of the South Metropolitan Company yielded less to-day than that of the Gas Light and Coke Company, and it was his recollection that over a period of time it yielded less than other gas stock.

Mr. *F. I. Pitman* (Messrs. Rowe & Pitman, stock and share brokers) also gave evidence to the effect that interference with the basic price would adversely affect the value of the Company's stock. As between the mean price of the Company's stock in 1924 and the price on April 30 of this year, there was a drop of 1¾ p.ct.; while in the same period there was a drop of 8½ p.ct. in that of the Gas Light and Coke Company, and 5 p.ct. in the case of the Commercial Gas Company's stock.

The Hon. EVAN CHARTERIS, cross-examining, obtained an admission that there should be a close relation between the basic and selling prices.

Mr. *H. T. Manly* (an Employee Director of the Company) said that the employees had been disappointed when they had received no bonus under the old co-partnership scheme, and when the stock they held depreciated to half its original value. They fully understood the present scheme, and appreciated highly the fact that they had a statutory right to their share. Parliament had given them something which nobody but Parliament could take away, and this knowledge gave them a feeling of security. The 1920 Act was the foundation of the co-partnership scheme; and the London County Council were asking for the removal of this foundation. The co-partners regarded the 1920 Act as their charter; and he earnestly pleaded that this charter be allowed to remain.

The CHAIRMAN asked if it were not the fact that when the co-partnership scheme was first adumbrated there was a great deal of opposition among the workers.

Witness said that only one section was opposed to it in 1889, when it was first introduced—namely, the stokers, who were advised by their trade union to have nothing to do with it. The Board of the Company therefore decided to abandon it; but the remainder of the workers asked them to reconsider their decision, and the scheme was applied. This led to a strike of the stokers, who were replaced; and when, later, some of the original stokers rejoined the Company, they also entered into the scheme. Since then there had been no opposition.

The Hon. EVAN CHARTERIS, cross-examining, said he wanted Mr. Manly to realize that the attitude of the London County Council was one of entire sympathy towards the co-partnership scheme, and they were not suggesting that anything should be done to disturb it.

Witness said he could not realize that. What the London County Council were suggesting would fundamentally alter the scheme.

CASE FOR THE L.C.C.

The Hon. EVAN CHARTERIS then addressed the Committee on behalf of the London County Council. It required conscious effort, he said, not to be over-shadowed by the imposing monument erected to the glorification of the Company by his learned and numerous friends, assisted by all the resources of self-commendation which the Company possessed—no doubt rightly—in such a degree. So far as the possession of all the aptitudes and all the virtues—scientific, commercial, and civic—which gas companies could possess was concerned, the Company probably possessed them in as great a de-

gree as any other company. It was important, however, to investigate the circumstances in which the Company obtained their powers under the Act of 1920. At the time the Company's Bill of 1920 was promoted, there was public legislation pending, and therefore the Council had urged that the Bill should not be passed. The Company had met this by saying that the Public Bill was to be applicable to the country, and not to London. But on the very day that Royal Assent was given to the Company's Bill, it was also given to the Gas Regulation Bill, which latter (the result of the most careful consideration) was made applicable to the whole country, including London. Secondly, Dr. Carpenter had obtained special legislation for his Company, and he had asked for those powers on the assumption that costs would remain as they were then, but that, if there were any alteration, it would be against the Company rather than in their favour. When the basic price was fixed at 11d. per therm, it was said that the possibility of selling at 10d. was a matter for the remote future; but within three years from that time the Company were selling at 8d. per therm. Subsequent events had shown the Company had been wrong regarding those two matters.

The Council now appeared in order to discharge a duty which was put upon them by Parliament, and to place before the Committee the strong views they had in regard to this matter. If there were to be a standard or a basic price, it did not need argument to show that, in order that it should be effective, it must bear some relation to the selling price. Otherwise there was no conceivable reason why Parliament should trouble to fix a standard or a basic price. In 1920 Dr. Carpenter said that the principle underlying his proposal was that there should be a close relationship between the basic price and the selling price. At present the margin was larger than was contemplated in 1920. Unless there was some means of having this margin investigated by an expert tribunal, it might increase indefinitely. As costs dropped, so would the margin increase. The duty of the Board of Trade, when considering the revision of prices, was to ascertain how much of the reduction in the price of gas was due to efficiency and economy on the part of the Company concerned, and to give the Company credit for that; and this was the practice of the Board of Trade. They only reduced the price in accordance with the fall in costs of production due to circumstances outside the control of the Company. This point had not yet been put before the Committee. The Council were not asking for a one-sided revision, but one which was eminently fair, inasmuch as it took into account changes in cost, whether they were in favour of or against the Company. The gas industry was one which was liable to fluctuations. Never had there been a time of greater uncertainty than the present; and it was because no one could tell what the level of prices would be for twelve months ahead that Parliament had thought it necessary to devise the machinery of the Gas Regulation Act for dealing with fluctuations, which might tell equally against the consumer or against the Company.

The only immutable thing was the position of the South Metropolitan Company. They were to be distinguished from any other company or local authority in the country, and to have preserved a basic price which was fixed in 1920, in view of contingencies which had not eventuated as expected. That price was to be preserved for a minimum of ten years. There was one illuminating factor in this case which had surprised him. Dr. Carpenter, having said in 1920 that the basis on which he proceeded was that there should be a close relationship between the selling price and the basic price, had stated on the present occasion that he would like to see the basic price remain as it was to-day, no matter what the change in costs might be. In the area of the Gas Light and Coke Company the sliding-scale operated; the standard price being 11d., based on a 4 p.ct. dividend. In order to pay the investor a dividend of 5 p.ct., that Company had to reduce their price to 9¾d. per therm; whereas the South Metropolitan Company could go on charging 11d. per therm or any higher sum they liked between now and 1935, and could still pay the investors 5 p.ct. If the Gas Light and Coke Company were to be regulated by the Gas Regulation Act, *a fortiori* the South Metropolitan Company should be. Again, a basic price company, in arriving at the price to the consumers, could lump together all the charges made for gas, and thereby obtain an average of the prices charged to private consumers and other consumers who paid a lower rate. In the case of the Gas Light and Coke Company, however, the price to the private consumer must be 9¾d. per therm if a dividend of 5 p.ct. were to be paid. Everything the promoters had said had justified the attitude of the County Council in asking that the South Metropolitan Company should be made subject to the same code which had been devised for maintaining the equilibrium between price and cost as was applicable to all undertakings in the country. He ventured to suggest—subject to correction—that there was no gas, water, or electricity company in the country exempt from revision of price for so long a period as ten years. When the South Metropolitan Company had asked for five years in 1920, the County Council, ignorant of the terms of the Gas Regulation Act, had accepted the promoters' offer in the circumstances of that time.

Mr. *C. D. Johnson* (Comptroller to the London County Council) said there was nothing in the Gas Regulation Act which took away the stimulus to reduce prices that was afforded by the possibility of increased dividends. The circumstances of the present time were so variable that any reductions in the cost of the production of gas brought about by good management were small in comparison with the variations due to fluctuations in the prices of materials and wages. Costs were more stable from the inception of the sliding-scale until 1914; and therefore the need for frequent revision was greater now than previously. In 1809 the Select Committee on Metropolitan Gas Companies presided over by Sir James Rankin reported that capital powers should not be granted to any gas company for more than five years if and when new capital was required, and that Parliament should revise the sliding-scale, either by way of increase or decrease, when any application for new capital was made, if circumstances appeared to require it. He considered that the present margin between the basic price and selling price was so great that the working of the sliding-scale was rendered ineffective. The South Metropolitan Company had a greater margin than the Gas Light and Coke Company or the Commercial Gas Company, though the dividends paid by the two latter Companies were subject to reduction if the selling price was increased above the standard price.

Cross-examined by Sir LYNDEN MACASSEY, witness admitted that he had had no complaints from consumers or from any Metropolitan Borough Council against the prices charged by the Company or the conduct of the undertaking. He did not suggest that consumers had reason to be dissatisfied; but that matter he considered was irrelevant.

Sir LYNDEN MACASSEY said that the Gas Light and Coke Company, on their present charges, were only entitled to pay a dividend equal to their pre-war dividend. This would make it impossible for the Company to raise capital at anything like par value, and they would have to issue it at about 85 p.ct. This meant that they must almost immediately ask the Board of Trade for another revision of the standard price.

Witness agreed, and said he saw no reason why they should not.

Sir LYNDEN MACASSEY asked whether this was conducive to the sound administration of a gas undertaking.

Witness replied that it was inconvenient at the moment. It was due to an unexpected rise in costs since the standard price was revised in 1923. Had it been clear in 1923 that prices would rise again between then and 1925, the standard price of the Gas Light and Coke Company would no doubt have been fixed at more than 11d.; but it would not have been left at 14·6d., which was the figure prior to 1923.

THE BILL TO PROCEED.

Sir LYNDEN MACASSEY, addressing the Committee, asked that they would not deprive the Company of the charter granted in 1920, unless the Company had shown default; but there was not a tittle of evidence that this was so. The London County Council had not called a single consumer to say that he was dissatisfied. The attitude of the Council had altered since 1920. Parliament had deliberately put the Company under a different scheme from that afterwards applied to other companies. It was definitely agreed between the Council and the promoters that revision of the basic price should be in the hands of Parliament. Had any ground been adduced to the Committee whereby the decision of Parliament and the agreement between the Council and the Company should be departed from, and a new system introduced? If the Committee altered the provisions of the 1920 Act, the effect upon the Company financially would be serious, and the confidence of the workers in their co-partnership scheme would be destroyed.

The Committee deliberated in private; and the Chairman announced that the Bill would be allowed to proceed.

BLACKPOOL CORPORATION BILL.

The Local Legislation Committee of the House of Commons have ordered this Bill to be reported for third reading. There are no substantial alterations to the gas clauses [see the "JOURNAL" for Jan. 21, p. 142].

Centenary at Keighley.—The centenary of gas lighting at Keighley will be celebrated during the week commencing Oct. 19 by a gas exhibition at the Municipal Institute and special cookery and other demonstrations.

Gas-Works Extensions at Blyth.—The Blyth Gas Company are proceeding with a scheme for big extensions to their works at Blyth and Bedlington. New plant is being put down at both places; and at Bedlington a big holder is to be erected, the contract for which has been placed with Messrs. Clayton, Son, & Co., of Leeds.

Price Reduction at Forfar.—The Forfar Town Council have agreed to reduce the price of gas by 3d. per 1000 c.ft. The new rates will be 3s. 3d. for ordinary purposes, 3s. for power, and 3s. 8d. for gas consumed through slot meters. The Council also decided to discontinue the practice of setting aside a yearly sum for depreciation.

Gas Prices at Nantwich.—The Gas and Lighting Committee of the Nantwich Urban Council have recommended that the prices of gas be revised as follows from the last readings in March: Ordinary meter consumers, lighting, 5s. 3d. per 1000 c.ft., with a further reduction of 2d. per 1000 c.ft. where the consumption reaches 50,000 c.ft. per quarter, and 1d. per 1000 c.ft. on every additional 50,000 c.ft. Power, 4s. per 1000 c.ft. with a further reduction of 3d. per 1000 c.ft. on a consumption of 50,000 c.ft. and upwards per quarter. Prepayment meters, 16 c.ft. per 1d., to take effect after the next reading of the meters.

Cheaper Gas at Kirkcaldy.—Submitting the accounts for the past year to the Kirkcaldy Town Council, Treasurer Reekie said that the progress of the Gas Department had been maintained, though the result did not show so large a credit balance. The quantity of gas made was only slightly less than the record of 1913-14; but the quantity accounted for was the largest, amounting to just on 151 million c.ft. They would remember the price was reduced 6d. per 1000 c.ft. last year; but, notwithstanding this, the estimated income of £44,870 was increased by £1016. On the other hand, the estimated expenditure was £30,200, and the actual was £522 more. The Department was heavily handicapped for reasons for which neither the present Town Council nor the management was responsible. The reduction in the price of gas from the top figure of 1921-22 was 2s. 10d. per 1000 c.ft., or 37½ p.ct. It had been recommended to further reduce the price of gas 5d. per 1000 c.ft. as from the last meter survey. The works were now well equipped, and manufacturing charges compared favourably with other gas undertakings; but with interest and sinking fund accounting for almost 1s. 10d. per 1000 c.ft., the comparatively high price of gas was easily understood.

MISCELLANEOUS NEWS.

CITY AND GUILDS OF LONDON INSTITUTE PASS LIST.

Successful Candidates in Gas-Works Practice, Gas Supply Practice, and Gasfitting Examinations.

WE have received from Mr. W. T. Dunn, the Secretary of the Institution of Gas Engineers, a list of successful candidates in the last examinations in Gas-Works Practice, Gas Supply Practice, and Gasfitting, which has been forwarded to him by the Superintendent of the Department of Technology of the Institute. The questions set will be found in the "JOURNAL" for May 13 and 20, pp. 480, 542.

GAS-WORKS PRACTICE—FINAL EXAMINATION.

FIRST CLASS.

Candidate's Name.	Examination Centre.
Ingham, Oswald R. S.	Sunderland
Agent, Lionel S.	East Ham
Wright, Garith A.	Bristol
Gross, Frederick A.	Portsmouth
Ogden, George	Blackburn
Greenwood, Irving	Burnley
Bury, Thomas R.	Do.
Kershaw, Robert W.	Liverpool
Broomhead, Harry	Manchester
Hill, John	Do.
Wright, Percival	Leicester
Hicks, Mary W.	L.C.C.
Baker, Herbert	Polytechnic, Regent Street
Belben, Charles H.	Do.
Kimmins, Lionel G.	Do.
Sharman, Ernest W.	Do.
Walker, Maurice	Do.
Challinor, Alfred T.	Stoke-on-Trent, Burslem
Ware, Gilbert C. J.	Redhill
Cowley, Leonard R.	Bradford
Lister, Horace	Do.
Hinchliffe, Jack	Huddersfield
Telford, Frank	Do.
Higham, Arthur L.	Hull
Nichol, Harold	Do.
Dearnley, Harry	Leeds
Hainsworth, Walter T.	Do.
Lewis, Thomas G.	Do.
Dow, Ernest S.	Middlesbrough
Davie, Duncan V.	Edinburgh
Boyle, James W.	Glasgow
Winfield, George A.	Sheffield
May, Charles L.	Ipswich

SECOND CLASS.

Candidate's Name.	Examination Centre.
Maycock, Harry	Bedford
Mayes, John Lowther	Do.
Gifford, Fred. John Alfred	East Ham
King, Ronald	Maidstone
May, Frederick John	Do.
Broughton, Geoffrey Walton	Burnley
Buckley, Arnold Howard	Liverpool
Buckley, John William	Do.
Kay, Donald Wyatt	Manchester
Murray, Wilfred	Wigan
Sharman, William Albert	Polytechnic, Regent Street
Wilshere, Lawrence Arthur	Do.
Whiteoak, Alan	Halifax
Beaumont, Frank	Huddersfield
Hornby, Frank	Hull
Craven, Kenneth Frederick	Leeds

SECOND CLASS (*continued*).

Candidate's Name.	Examination Centre.
Marson, Rowland Ewart	Leeds
Payne, Wilfred Charles	Do.
Shaw, Stanley	Do.
Webster, John	Glasgow

GAS SUPPLY PRACTICE—FINAL EXAMINATION.

FIRST CLASS.

Candidate's Name.	Examination Centre.
Cobb, Fredrick Harry	East Ham
Jones, Herbert	Do.
Kimber, Harold Antoine C.	Do.
Lilly, Kenneth Arthur	Portsmouth
Ashbee, Douglas Gordon	Do.
Crayden, Alfred John	Do.
Greenwood, Irving	Burnley
Warren, William James	L.C.C.
Poulter, Lionel	Do.
Chapman, William Victor	Do.
Horsfall, Albert Victor	Do.
Ouzman, Sidney E. J.	Do.
Tutt, George Thomas	Do.
Bowler, Percy John	Do.
Mann, William John	Do.
Osborne, Charles George	Do.
Gardiner, Stanley Frederick	Great Yarmouth
Jones, Cecil Bernard	Newport, I. of W.
Bottomley, Harold	Halifax
Dow, Ernest Stanley	Middlesbrough
Webster, John	Glasgow
Boyle, James Wilson	Do.

SECOND CLASS.

Candidate's Name.	Examination Centre.
Gill, Percival William	Exeter
Wallis, Reginald Alfred	East Ham
Harris, Charles	Do.
Coggins, Harold Wilson	Do.
Millett, Horace David Victor	Portsmouth
Duckett, Roland	Burnley
Gould, William Henry	Do.
Crowe, Edward	Manchester
Howard, Edgar	Do.
Howes, Harold	Do.
Johnston, Charles Albert	Do.
Morton, Norman	Do.
Prior, William Frederick J.	L.C.C.
Jones, Arthur Austin	Do.
Wiles, Hubert	Do.
Fry, William Thomas	Do.
Dickson, William James	Do.
Trangmar, Henry James	Do.
Farthing, Frank	Do.
Ford, Edmund	Do.
Elson, Sidney Charles	Do.
Simmonds, Harold	Do.
Cromarty, Alfred William	Do.

SECOND CLASS (*continued*).

Candidate's Name.	Examination Centre.
Sutherland, Geoffrey Warren	L.C.C.
Bishop, Leslie William A.	Do.
Holden, Frederick	Do.
King, William Vincent	Do.
Perry, John Celeste	Do.
Graham, Frederick	Do.
Gellieff, Arthur Alexander	Do.
Turner, Leonard Charles	Do.
Farthing, Percy Arthur G.	Do.
Bass, James Sydney	Do.
Steer, John Frederick	Do.
Birch, George Henry	Do.
Gooch, George William	Do.
Wright, Albert Edward	Do.
Wait, Albert George	Do.
Braham, Stephen Walter	Do.
Lewis, Maximilian	Do.
James, Charles Henry	Do.
Brandon, Ralph Hodgson	Do.
Cooper, William Percy	Do.
Truscott, Charles Frederick	Do.
Phillips, Arthur George	Do.
Pratt, Ernest Bernard	Do.
Franks, Geoffrey Charles R.	Do.
Bannister, Alfred Amos	Goldsmiths' College
Forrest, Thomas James	Do.
Gibbs, Ernest James	Do.
Ware, Gilbert Charles J.	Redhill
Skinner, Alec. George	Do.
Andrew, Arnold Percival	Hull
Hainsworth, Walter Thorp	Leeds
Smith, John Edwin	Scarborough

GASFITTING—FINAL EXAMINATION.

Candidate's Name.	Examination Centre.
*Pike John Lawry	Exeter
*Mills, Harold Ralph	Do.
*Knowles, Frederick John	L.C.C.
*Ramplin, Maitland Edwin	Do.
†Birch, Oliver Thomas	Do.
*Farthing, Frank	Do.
†Timberlake, A. William	Acton
*Phillips, Harry	Walsall
*Reynolds, John	Do.
*Smith, William Butler	West Bromwich
*Jones, John Henry	Do.
*Woodhall, Albert	Do.
*Callaway, Samuel Thomas	Birmingham
*Goodall, Edward John	Do.
*Morris, Arthur Herbert	Do.
*Palmer, Charles John	Do.
*Powell, Arthur Richard	Do.
†Smith, Bernard Frederick	Do.
*Smith, Walter Edwin	Do.
*Simpson, Herbert	Do.
*White, Herbert John	Do.
*Wynn, Harold John	Do.
*Hopper, Horace	Scarborough
*Smith, John Edwin	Do.
*Hudson, James Albert	Do.

* First Class. † Second Class.

PROGRESS AT DENTON.

The Chairman of the Gas Committee, at the last meeting of the Denton Council, stated that the announcement of the reduction in price of gas of 5d. per 1000 c.ft. (1d. per therm) had been well received by the consumers. The stove firms who exhibited at the recent exhibition at the Co-operative Hall were General Gas Appliances, Ltd., R. & A. Main, Ltd., the Richmond Gas Stove Company, Ltd., and Wilsons & Mathiesons, Ltd. As a result of the exhibition orders for appliances had been received amounting to over £500. This was very gratifying to the Committee, and spoke well of the arrangements made by the Gas Engineer and his staff.

The Council also passed the statement of accounts of the gas undertaking for the year ended March 31. The Chairman of the Gas Committee stated that the sales of gas had increased by 4 million c.ft. over the previous year; equal to 5·1 p.ct. Though the market value for tar had decreased, the income to the Department had increased by over £1000. The net profit, after meeting all demands for sinking fund charges, interest on loans, payment of annuities, &c., was £645. During the past year over £5000 of loan money had been repaid. The deficiency account had been lowered from £22,821 in 1922 to £14,710 this year.

Portsea Island Gas Light Company's Proposals.—Notice has been served by the Portsea Island Gas Light Company upon the Portsmouth Corporation of their intention to apply for a Special Order empowering them to purchase the undertaking of the Havant Gas Company, to extend in other directions their limits of supply, to consolidate and convert their existing, and to raise additional, capital, and to change their name. The Finance Committee of the Corporation report that it may be necessary to lodge objections to the granting of the Order, in order to ensure that the interests of consumers of gas in the borough are adequately protected. The nature and extent of the objections are now being considered by the Committee, who have been empowered by the Council to take all requisite steps; and a Special Sub-Committee have been appointed to deal with the matter.

SPECIAL ORDERS—NEW STANDING ORDER.

A new Standing Order relating to Special Orders was agreed to in the House of Lords on the 14th inst. It is in the following terms:

(1) In this Standing Order the expression "Special Order" means any Order in Council, departmental order, rules, regulations, scheme, or other similar instrument directed under any Act to be laid, or laid in draft, before the House, and requiring an affirmative resolution of the House before becoming effective or being made, with the exception of (*a*) measures under the Church of England Assembly (Powers) Act, 1919; and (*b*) any rules made under the Government of India Act.

(2) At the commencement of every session a Standing Committee shall be appointed to which all Special Orders shall stand referred. The Committee shall be called the Special Orders Committee, and every Special Order shall stand referred to the Committee so soon as it has been laid upon the Table of the House. The Lord in charge of a Special Order referred to the Committee shall be a member of the Committee during the consideration of such Special Order.

(3) The Special Orders Committee shall take into consideration every Special Order so referred, and in considering it shall have regard to—

(i.) Whether the provisions of the Special Order would, but for the provisions of the Act authorizing the making of the Special Order, require to be enacted by a Public Bill.

(ii.) Whether the provisions of the Special Order would, but for the provisions of the Act authorizing the making of the Special Order, require to be enacted by a Private or Hybrid Bill.

(4) It shall be open to any person or persons to present a Petition praying to be heard upon the merits against any such Special Order as is referred to in paragraph (3) (ii.) hereof who would have been entitled to petition against a Bill containing the same provisions.

Every such Petition shall be presented by being deposited in the Private Bill Office not later than 3 p.m. on the fourteenth day after the Special Order has been laid upon the Table of the House.

In the event of such period expiring during a Parliamentary recess, it shall stand extended to 3 p.m. on the third ensuing day upon which the House shall sit for public business.

Every such Petition shall stand referred to the Special Orders Committee without further order, and in any proceedings on such a Petition, three members, including the chairman, shall form a quorum.

(5) Where the Special Order is of the nature referred to in paragraph (3) (i.) hereof, the Special Orders Committee shall consider—

(i.) Whether the provisions raise important questions of policy or principle.

(ii.) How far the Special Order is founded on precedent.

(iii.) Whether, having regard to the answers to the two preceding questions and to any other relevant circumstances, the Order can be passed by the House without special attention, or whether there ought to be any further inquiry before the House proceeds to a decision upon the resolution, and, if so, what form that inquiry should take, and shall report to the House accordingly.

(6) Where the Special Order is of the nature referred to in paragraph (3) (ii.) hereof, the Special Orders Committee shall not make any report to the House upon the same until after the limit of time for petitioning against such Special Order has expired.

If no Petition has been presented praying to be heard against such Special Order, the Special Orders Committee shall then report accordingly to the House.

Where any Petition has been presented praying to be heard against such Special Order, the Special Orders Committee shall then examine the Special Order in connection with any Petition against the Order that stands referred to the Committee, and shall consider—

(i.) Whether the Petition discloses substantial grounds of complaint.

(ii.) Whether the matter has been so dealt with upon a departmental inquiry as that further inquiry is unnecessary.

(iii.) Whether the submissions in the Petition could have been brought before a local inquiry and were not.

(iv.) Whether, having regard to the answers to the preceding questions and to the findings, if any, of these inquiries and to the other circumstances of the case, there ought to be a further inquiry by a Select Committee, and shall report to the House accordingly.

(7) In the case of every Special Order, where the Committee have any doubt whether the Order is *intra vires* they shall report to the House accordingly.

(8) No motion for an affirmative resolution of the House in connection with any Special Order shall be placed upon the notice paper of the House until after the Special Orders Committee has reported thereon, and in the event of Parliament being prorogued or dissolved before such report has been made, such Special Order shall not again stand referred to the Special Orders Committee until it has been laid again on the Table of the House.

Price Increase at Dunfermline.—It has been decided by the Dunfermline Town Council, on the recommendation of the Gas Committee, to make an increase in the price of gas equivalent to 4d. per 1000 c.ft. The new price will take effect in the case of ordinary consumers from the next meter readings, and immediately in respect of bulk supplies.

Dundee Gas Accounts.—The accounts of the Dundee Gas Commissioners for the year 1924-25 show that the quantity of gas delivered, under the management of Mr. James Dickson, was 1688 million c.ft.; the price in Dundee (subject to a discount of 5 p.ct.) being 3s. 4d. per 1000 c.ft. The income was £344,115, and the expenditure £294,887—leaving a balance to meet annuities, interest, sinking fund, and contingent fund of £49,228. The profit and loss account showed a loss of £10,404.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The demand for prompt coals, in view of the threatened stoppage next month, has continued very keen, and there is little free coal available. Contractors have been pressing for as much coal as collieries can supply, with the result that the latter are mostly fully stemmed for the remainder of the month.

The demand, apart from gas-works, has been very largely for coaling station requirements and for home stocks. Continental consumers appear to be far from alarmed at the prospect of a stop, which is noteworthy as indicating the supplies which are available from other quarters.

Prices in many cases are purely nominal, owing to there being little or no coal for sale. Wear Specials and best quality gas are called 20s. to 21s. f.o.b., and seconds, which have been extensively sold at about 17s. 6d., now quote 18s. to 18s. 3d.

Business on 'Change is largely confined to the arranging of loading trains; there being practically no more coal for sale for prompt delivery, and forward business being naturally very largely in abeyance.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

As the chances of averting a conflict in the coalfields have grown fainter, market tension has increased. Output has been augmented at most of the pits to cope with incoming orders. A corresponding acceleration in the distributive system has not been achieved, however, owing partly to the absence of a number of railway workers on holiday. The discharge and return of wagons to the collieries has been subject to considerable delay, and dislocation has been aggravated rather than amended with the development of the pressure. Some collieries are refusing to book further orders till they can see a way out of the impasse. While the rush of orders is most pronounced in the house coal trade, industrialists are bestirring themselves, particularly in the light metal working branches. The result is a sharp stiffening of prices. Some of the quotations are clearly not intended to lead to business, but advances of 2s. to 3s. on the summer list are being paid. It is difficult to get firm quotations in the prevailing stringency, prices ruling at date of delivery being stipulated for. Collieries which were offering slacks and smalls at very low prices a few weeks ago have been able to command as much as 4s. a ton more owing to the tightening of the market.

The general level of gas coke prices has not been altered, there being large stocks to draw upon. Foundry coke is likewise in fair supply, though some of the ovenmen have withdrawn quotations.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The acute situation of the coal trade has been further aggravated during the week by an increased uncertainty as to the ultimate result of the negotiations. House coal has, in consequence, appreciated in value, particularly in the Metropolitan area, whither heavy quantities have been and are still being sent at figures much above those ruling a month ago. To a much lesser degree the more local markets are now in sympathy, though prices do not show much alteration, except in isolated instances, from those operating during the early summer months. Householders are evidently anticipating their orders or putting a little into stock.

The situation industrially is rather spasmodic, owing to the position of trade in each particular class of concern. While some appear to be indifferent about a strike owing to the state of their trade, others, in sympathy with the workmen and in order to save standing charges as far as possible, are putting coal into stock to a limited extent. Prices for the majority of steam-raising fuels have stiffened, and collieries report no stocks in wagons. There are, however, stocks on the ground.

Gas concerns are not unduly anxious, as the light consumption has made it practically easy for all contractors to supply them with more than the necessary obligations. There has, therefore, been no tendency towards advancement in figures for this coal.

The export market has moved somewhat artificially, there being an increased demand for such coal as best South Yorks hards, which have appreciated considerably, now being quoted at 24s. 6d. f.o.b. Hull. In some quarters it is stated that this is due to the fact that exporters have obligations to fulfil of a speculative nature, and are naturally afraid that, with the anticipated increased demand for inland consumption, all coals will be firmer during the remainder of the month, and that the buyers abroad are not prepared to pay anything approaching the above-mentioned figure. Other qualities have advanced to a lesser degree; and as it does not appear at the moment that there is a possibility of a settlement next week, the situation will become more acute.

Prices at Hull at the week-end were (f.o.b. usual shipping ports): South Yorkshire—Hards, Association, 24s. to 24s. 6d.; screened gas coal, 20s.; washed doubles, 20s. to 21s.; washed singles, 19s. to 20s.; washed smalls, 17s. 3d. to 17s. 6d.; unwashed smithy peas, 23s. to 25s. per ton. West Yorkshire—Hartleys, 20s.; screened gas coal, 19s. to 20s.; washed trebles, 20s. to 21s.; rough slack, 14s. to 15s. per ton. Derbyshire and Notts—top hards, 22s. to 25s.; rough slack, 14s. to 15s. per ton. Yorks, Derbys, and Notts—Screened steam coal, 18s. to 22s.; gas coke, 19s. to 20s.; furnace coke, 20s. to 20s. 6d. per ton.

TRADE NOTES.

Morris Runways.

Messrs. Herbert Morris, Ltd., of Loughborough, have published a booklet (No. 103) entitled "Making Money with Morris Runways." This illustrated pamphlet shows many applications of the firm's runways.

Modern Methods of Coal Handling.

A series of photographs has been compiled by Messrs. Spencer (Melksham), Ltd., of No. 32, Queen Victoria Street, E.C. 4, of the different types of coal handling plant they manufacture. These photographs are of actual installations, which make them all the more interesting.

CONTRACTS OPEN.

Roads, Sewers, &c.

Tenders are invited by the County Borough of Burnley for the construction of roads, sewers, buildings, &c., in connection with their new gas-works at Old Hall. [See advert. on p. 244.]

Retort Bench, Mouthpieces, &c. (Work and Materials).

Tenders are invited by the Gas Committee of the Burnley Corporation for the work and materials required in the supply and erection of plant on the site of the new gas-works at Old Hall. [See advert. on p. 244.]

EXTENSIONS.

New Holder for Forfar.

On the recommendation of the Gas Committee, the Forfar Town Council have decided upon the erection of a new holder; and the sanction of the Secretary for Scotland is to be sought to the borrowing of £20,000.

Hinckley Main Extension.

The Hinckley Urban District Council propose laying a new gas main to Burbage, at a cost of £3000.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

July 20.

There is rather more inquiry for pitch, and the market shows a slightly firmer tendency at 40s. to 42s. 6d. per ton, in bulk, at makers' works.

The demand for road tar continues unabated; and it is evident that a considerably larger area of road will be tarred this year as compared with previous years.

Creosote is steady at about 6⅞d. to 7d. per gallon, in bulk, at makers' works.

Tar spirits are scarce and firm. Pure benzole and pure toluole are 1s. 11d. to 2s. per gallon; 95-160 solvent naphtha, 1s. 8d. to 1s. 9d. per gallon. The demand for motor benzole is in excess of available supplies.

Tar Products in the Provinces.

July 20.

The average values for gas-works products during last week were: Gas-works coal-tar, 26s. to 31s. Pitch, East Coast, 39s. to 40s. f.o.b. West Coast—Manchester, 34s. to 35s.; Liverpool, 35s. to 36s.; Clyde, 38s. to 39s. Benzole, 90 p.c.t., North, 1s. 7½d. to 1s. 8½d.; crude, 65 p.c.t., at 120° C., 1s. to 1s. 1d., naked at makers' works; 50-90 p.c.t., naked, North, 1s. 7½d. to 1s. 8½d. Toluole, naked, North, 1s. 6½d. to 1s. 7½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8½d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. to 1s. 2d. Creosote, in bulk, North, liquid, 5⅞d. to 6d.; salty, 5⅝d. to 5⅞d.; Scotland, 5½d. to 5¾d. Heavy oils, in bulk, North, 6½d. to 7d. Carbolic acid, 1s. 5d. to 1s. 6d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.c.t., purely nominal; "B" quality unsaleable.

Ossett Gas Department.—At a recent meeting of the Ossett Corporation Gas Committee the Manager submitted his annual report for the year ended March 31, 1925, and the Borough Treasurer submitted the statement of accounts for that period, showing a net profit for the year of £2611, and leaving a net deficit on revenue account of £3091.

Flint Gas-Works Ownership.—A proposal that a Committee be appointed to consider the question of the purchase of the gas and water undertakings was brought before the Flint Town Council last week. During the discussion, it was pointed out that the present was a most inopportune time to contemplate buying the works; and it was decided to defer the matter.

Walsall Gas Department.—At a meeting of the Walsall Town Council recently, Mr. Lechie, in moving the adoption of the annual report of the Corporation Gas Department, pointed out that the undertaking had contributed £11,731 to the relief of the rates during the past year; and of the net balance of £11,018 standing to the credit of the appropriation account on March 31, 1925, £9000 was earmarked for the reduction of the rates during the present year, leaving a balance of only £2018. In view of the exceptional difficulties under which gas undertakings had been working, the position was not at all unsatisfactory. The residual question had given the greatest anxiety; but, on the whole, the Manager was to be congratulated on being able to place such accounts before them.

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GAUGES

TO SUIT YOUR REQUIREMENTS IN

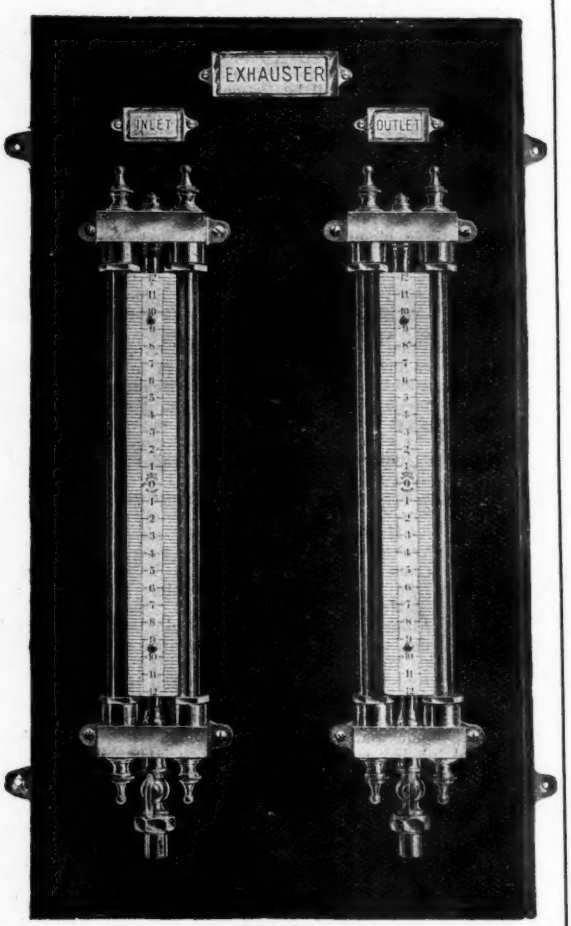
SIZE,

PURPOSE,

AND

QUALITY.

ENQUIRIES SOLICITED.



No. 146.

SAWER & PURVES

(BRANCH OF METERS LTD.),

Miles Platting, MANCHESTER.

Radford Road, NOTTINGHAM.

45 & 47, WESTMINSTER BRIDGE ROAD,

LONDON, S E.1.

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2025 (Central) Nottingham.
2412 (Hop) London.

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"Sawer Nottingham."
"Metrique Lamb London."

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 15.]

Nos. 17,262-17,838.

ALDRIDGE, J. G. W.—"Discharging charger-conveyors for gas retorts, &c." No. 17,438.
BEAVAN, T. A.—See Aldridge, J. G. W. No. 17,438.
CLARK, F. W.—"Low-temperature distillation of coal." No. 17,353.
DEMPSTER & SONS, LTD., R.—"Apparatus for discharging retorts." No. 17,602.
INTERNATIONAL HYDROCARBON CORPORATION.—"Gas manufacture." No. 17,560.
MANCHESTER FURNACES, LTD.—"Burners." No. 17,535.
SNELL, C. SCOTT-.—"Hotplates for gas cookers." No. 17,409.
TOOGOOD, H. J.—See Dempster & Sons, Ltd., R. No. 17,602.
TRAVERS, M. W.—See Clark, F. W. No. 17,353.
TUSON, H. R.—"Device for controlling taps of gas stoves, &c." No. 17,372.
WADE, H.—See International Hydrocarbon Corporation. No. 17,560.
WILSON, S.—"Gas regulators." No. 17,600.
WILSON, W.—"Gas meters." No. 17,753.

W. Tice & Co.'s Successors is the title of a Company registered, with a capital of £100, to acquire the business formerly carried on by Messrs. W. Tice & Co., Ltd. (in liquidation), and to act as manufacturers of gas economizers and of other appliances for regulating the use of gas.

Gas for Housing Schemes.—A supplement to the "Sheffield Independent" dealing with housing schemes contains a practical article by Mr. Ralph Halkett, General Manager of the Sheffield Gas Company, on the advantages of gas for lighting, heating, and power. Mr. Halkett puts forward in simple language a number of facts in favour of gas which are deserving of careful consideration by architects, builders, and tenants; and so his article constitutes good propaganda work.

Tiverton Gas-Works Results.—The Tiverton Gas-Works made a gross profit of £1172 last year; and out of the net credit balance it has been decided to allocate £250 in relief of the rates, and to carry forward £309 to the reserve account. Replying to remarks at last week's meeting of the Corporation, the Chairman of the Gas Committee pointed out that all but about £9000 of the £40,000 originally borrowed had now been repaid, and that several hundreds of pounds had been allocated from the profits in relief of the rates.

New Showrooms at Stoke-on-Trent.—New showrooms of the Stoke-on-Trent City Gas Department were opened in Hanley last Thursday afternoon by Alderman T. Mitchell (Vice-Chairman of the Gas Committee). The Chairman of the Committee (Mr. C. H. Bowers) was prevented from attending by a business engagement. Tea was afterwards served in the Victoria Hall, where the Mayor of Newcastle (Staffs.), Mr. A. Hassam, proposed the toast of "The City of Stoke-on-Trent and Success to the Gas Undertaking." The Mayor of Stoke-on-Trent (Alderman H. Leese) responded. In the course of the speeches it was intimated that the centralization of gas manufacture was likely to result in a cheaper supply in the not distant future.

The Launceston Gas Company have reduced the price of gas by 1d. per therm, bringing it to 1s.

The Committee of the London Stock Exchange have now granted permission for the shares of Messrs. Ewart & Son, Ltd., to be dealt in on the London Stock Exchange.

On the 10th inst. there was great excitement in the Blackfriars Road, London, owing to the fusing of an electric cable. Smoke suddenly burst from a manhole in the pavement; and it was so dense that until it cleared away it became necessary to stop the traffic. Then flames, it is reported, rose from the manhole to the height of about 12 ft.

Awards were announced last week in the tenth annual Fairy Gas Competition, under the auspices of the British Commercial Gas Association, held for children at Bradford. The local prizes were provided by the Bradford Gas Committee, £10 being set aside for the purpose. The competition was in the form of an essay on "The Gas Meter and Household Economy," together with a painting section for younger children. The Bradford prizewinners will receive the prizes at their respective schools at the hands of the Chairman of the Bradford Gas Committee (Councillor George Walker) later in the year.

Alfred Bayliss has died as a result of injuries received in an accident on July 2 at the new Birmingham Corporation Gas-Works at Washwood Heath. He was engaged, with two other men, who were also injured, on a gasholder in course of erection; and they were hauling themselves up to the top by means of a cradle. The tackle slipped, and the men fell a distance of 30 ft. The inquest was opened on Wednesday last, before the Birmingham City Coroner, and evidence was given by Dr. Adams to the effect that the injuries to Bayliss consisted of a fracture of the pelvis and burns to the hands and forearms. Death was due to pneumonia. The mother stated that her son told her that the fire used for heating rivets fell on him. The inquiry was adjourned until Aug. 11, in order that the injured men might attend.

GAS REGULATION ACT, 1920.

BOYS' CALORIMETER

CALORIMETERS

PRESCRIBED BY

The Gas Referees

ARE

MANUFACTURED

:: PRINCIPALLY ::

BY

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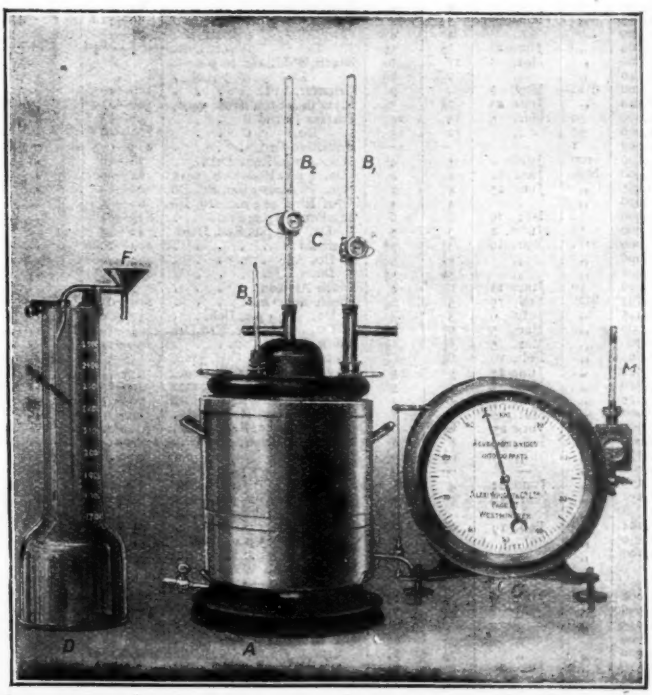
& CO., LTD.,

1, WESTMINSTER PALACE GARDENS,

WESTMINSTER, S.W. 1.



STOCK MARKET REPORT.

THE Stock Exchange last week was dominated by the rubber "boom," and, judging by the encouragement given in the financial papers by interested parties, it is likely to continue. Prices at the end of the week were at their highest.

Gilt-edged securities are gradually improving, but prices are appreciably lower than the best of this year. With the financial position becoming more stabilized as a result of the gold receipts from abroad, the improvement is likely to continue. The announcement of the issue in London of £5,000,000 5 p.ct. Australian Loan indicates that the embargo on Colonial loans is being removed. The issue is an attractive one, and it is anticipated that it will be over-subscribed.

The frenzied activity in the Rubber Market caused other markets to be neglected. Iron, Coal, and Steel, in spite of the uncertainty with regard to the negotiations with the miners, found some inquiry at lower levels. Slightly better traffic returns had little effect on Home Rails. All the balance-sheets of the "big five" Banks have now appeared. In the aggregate, deposits have declined during the half-year by about 1 p.ct., and advances disclose an increase in the ratio to deposits of about 3 p.ct. The shares show a tendency to droop.

In the Gas Market the gradual depreciation still continues. Gas Light ordinary recovered 1 to 82½-84½, but Alliance and Dublin and Commercial 4 p.ct. were marked down 2 points, Commercial 3½ p.ct. and Aldershot 5 p.ct. 1 point, and Primitiva fell 3d. to 8s. 3d.-9s. 3d. On the Newcastle Exchange, the local Company's stock fell 4 points to 69-71. No dividend announcements were made during the week, but some will doubtless appear before these notes are in print. Although all the companies have suffered severely from the fall in the values of residuals, there seems to be little doubt that the authorized rates of dividend will be declared, except in the case of those companies whose standard dividends have not been revised.

The following transactions were recorded during the week:

On Monday, British 7 p.ct. preference 121½, 122, Gas Light and Coke 82⅝, 82⅞, 83⅜, 83½, 3½ p.ct. maximum 61¾, 3 p.ct. debenture 58¼, 59, 59½, 60, Hastings and St. Leonards 5 p.ct. converted 94, Imperial Continental 139½, Newcastle-on-Tyne 3½ p.ct. 73¾, Primitiva 8s. 6d., 8s. 7½d., 9s., South Metropolitan 92, 92¼, 3 p.ct. debenture 58, 58½ *ex* div., 6½ p.ct. debenture 103, South Suburban 5 p.ct. 92½.

On Tuesday, Bournemouth 4 p.ct. debenture 79, 79½, Cape Town 7½, Continental Union 7 p.ct. preference 87⅞, 88⅝, Croydon Sliding-Scale 100, 100½, Maximum Dividend 83½, 84, Gas Light and Coke 83, 83¼, 83⅜, 83⅝, 4 p.ct. preference 77½, 78, Imperial Continental 137⅜, 138, 139½, Primitiva 8s. 9d., South Metropolitan 92¼, 92½, 93. Supplementary prices, Brentford 6 p.ct. mortgages 98, Cambridge University and Town 5 p.ct. debenture 95½.

On Wednesday, Bombay 19s., Gas Light and Coke 83, 83½, 84, 84¼, 4 p.ct. preference 78, 78⅜, 3 p.ct. debenture 58½, Imperial Continental 138½, 139, 139⅜, 140, Primitiva 8s. 6d., 8s. 7½d., 9s., South Metropolitan 92½, Wandsworth 3 p.ct. debenture 58.

On Thursday, Aldershot "C", 77½, 78, Bournemouth 5 p.ct. 12⅜, Brentford "B", 93½ *ex* div., British 105, 107, Commercial 3 p.ct. debenture 56½, Continental Union 35⅜, 7 p.ct. preference 88½, 89, Gas Light and Coke 83½, 84½, 3 p.ct. maximum 61, 62, 4 p.ct. preference 78, Imperial Continental 139, 140¼, Montevideo 67½, 67⅞, 68, Primitiva 8s. 6d., 8s. 7½d., South Metropolitan 92¼, 92½, 92⅞, South Suburban 5 p.ct. debenture 93, Wandsworth (Epsom) 3 p.ct. debenture 58½. Supplementary prices, British (Norwich) 4 p.ct. mortgage debentures 74⅜, Danish 82s. 6d., 85s., Wrexham 5 p.ct. 74½.

On Friday, Alliance and Dublin 64½, Gas Light and Coke 84, 84⅛, 84½, 3½ p.ct. maximum 62½, Imperial Continental 139½, 140, Primitiva 8s. 3d., 8s. 4½d., 8s. 9d., 9s., 4 p.ct. debenture (1911) 65½, South Metropolitan 92½, 3 p.ct. debenture 58½ *ex* div. Supplementary prices, Cambridge University and Town 5 p.ct. debenture 95½, 95⅝.

Large supplies of credit were available in Lombard Street at the end of the week. Overnight rates ranged from 3¼ down to 3 p.ct. The discount market closed with a weak tone on the announcement that Treasury Bills had been allotted at £4 4s. 6·41d. p.ct., as compared with £4 7s. 10·46d. p.ct. the previous week.

In the Foreign Exchange Market both French and Italian currencies were inclined to weaken. The Paris cheque, after touching 103·55, closed at 103.27½; the Milan rate closing at 131¼. Sterling on New York was steady at 4.86.83/32. A feature of the "neutral" currencies was the strength of Dutch florins, the Amsterdam exchange falling to 12.11½.

Cash Silver remained at 32d. per oz., and Gold was quoted at 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on March 5. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. July 17.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C.	77—80	−1	77½—78
295,492	"	"	4	4	Do. 4 p.c. Pref.	71—76	..	..
1,551,868	"	Apl. 2	6½	6½	Alliance & Dublin Ord.	63—68	−2	..
374,000	"	July 9	4	4	Do. 4 p.c. Deb.	60—63*	..	64½
300,000	I	May 7	1/7⅛	1/7⅛	Bombay, Ltd.	1/6—1/7	..	..
170,000	10	Mar. 5	8½	8½	Bournemouth 5 p.c.	12—13	..	10/0
425,050	10	"	7	7	Do. B 7 p.c.	12½—12¾	..	12⅜
150,000	10	"	7	7	Do. Pref. 6 p.c.	11—12	..	..
50,000	Stk.	June 25	6	6	Do. 3 p.c. Deb.	56—59	..	..
162,025	"	"	3	3	Do. 4 p.c. Deb.	77—80	+1	..
992,045	"	July 9	4	4	Brentford A Con.	92—97*	+1	79—79½
990,500	"	"	6⅛	6⅛	Do. B New	91—96*	−1	..
76,000	"	"	6⅝	6⅝	Do. 5 p.c. Pref.	93—96*	..	93½
306,690	"	June 11	5	5	Do. 4 p.c. Deb.	75—80	..	..
181,337	"	"	4	4	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	"	Mar. 5	6	6	Brighton & Hove Orig.	165—170	..	..
244,200	"	"	11½	12½	Do. A Ord.	122—125	..	..
1,287,500	"	Feb. 19	8½	9½	Bristol 5 p.c. max.	96½—97½	..	..
855,000	"	Mar. 19	8	8	British Ord.	105—110	..	..
100,000	"	June 25	7	7	Do. 7 p.c. Pref.	120—125	..	104—107
120,000	"	"	7	7	Do. 4 p.c. Red. Deb.	71—76	..	121½—122
100,000	10	May 21	4	4	Cape Town, Ltd.	6½—7½	..	..
100,000	10	Apl. 23	6	8	Do. 4½ p.c. Pref.	6—7	..	7 7/16
150,000	Stk.	June 25	4½	4½	Do. 4½ p.c. Deb.	69—74	..	..
626,860	"	Feb. 19	4½	4½	Cardiff Con. Ord.	101—104	..	..
237,860	"	June 25	6	6	Do. 7½ p.c. Red. Deb.	101—104	..	..
157,150	"	Feb. 19	7½	7½	Chester 5 p.c. Ord.	101—104	..	..
1,513,280	"	Mar. 5	6½	6½	Commercial 4 p.c. Cap.	89½—94½*b*	..	..
560,000	"	"	6	6	Do. 3½ p.c. Cap.	82—87	..	..
475,000	"	June 11	5/14/8	5/14/8	Do. 3 p.c. Deb.	82—87	−2	..
800,000	"	14 Jan. 15	3	5⅜	Continental Union, Ltd.	56—59	−1	..
200,000	"	June 11	—	—	Do. 7 p.c. Pref.	32—37	..	56½
660,000	"	Mar. 5	7	7	Croydon sliding scale	85—89	..	35⅜
284,975	"	"	6½	6½	Do. 'max. div.	98—102	..	87½—89
492,270	"	Feb. 19	5	6	Derby Con.	83—86	..	100—101½
55,000	"	Jan. 8	9	9	Do. Deb.	110—112*c*	..	83½—84
1,002,180	10	Jan. 22	4	4	European, Ltd.	74—76*c*	..	..
16,460,070	Stk	Feb. 19	4	4	Gas Light & Coke 4 p.c. Ord.	7—8	..	..
2,600,000	"	"	5½	5½	Do. 3½ p.c. max.	82½—84½	+1	..
4,062,235	"	"	3½	3½	Do. 4 p.c. Con. Pref.	61—64	..	82½—84½
4,761,930	"	June 11	4	4	Do. 3 p.c. Con. Deb.	77—80	..	61—62½
130,000	"	"	3	3	Do. 10 p.c. Bonds	58—61	..	77½—78½
42,000	"	—	10	10	Do. 7½ p.c. Ilford Deb.	..	..	58½—60
82,500	"	"	10	10	Hastings & St. L. 5 p.c. Conv.	..	..	..
70,000	"	Mar. 19	7½	7½	Do. 3½ p.c. Conv.	92—97	..	..
258,740	"	"	6½	6½	Hongkong & China, Ltd.	73—78	..	94
70,000	10	May 7	5½	5½	Hornsey 7 p.c.	17—18	..	..
86,600	Stk.	Mar. 5	10	10	Imperial Continental Cap.	136—141	..	..
1,976,000	"	May 21	10	10	Do. 3½ p.c. Red. Deb.	137—142	..	..
263,950	"	Feb. 5	10	10	Lea Bridge 5 p.c. Ord.	71—74	..	137½—140½
235,242	"	Mar. 19	3½	59	Liverpool 5 p.c. Ord.	96—101	..	..
2,127,340	"	Feb. 19	6½	6½	Do. 7 p.c. Red. Pref.	86—87*b*	..	..
600,000	"	Mar. 19	5½	5½	Maidstone 5 p.c. Cap.	103½—104½*b*	..	..
165,736	"	Feb. 19	7	7	Do. 3 p.c. Deb.	122—132	..	..
63,480	"	Mar. 19	9	8	Malta & Mediterranean	52—57	..	..
75,000	"	June 25	3	3	Montevideo, Ltd.	4—4½	..	..
541,920	5	June 25	5	7	Newcastle & Gateshead Con.	65—69	..	..
2,061,315	Stk.	June 11	4	4	Do. 4 p.c. Pref.	69—71*d*	..	67½—68
300,929	"	Mar. 5	5	5	Do. 3½ p.c. Deb.	77—78*d*	−4	73½
529,705	"	"	4	4	North Middlesex 10 p.c.	67½—68½*d*	..	..
15,000	"	June 21	3½	3½	Do. 7 p.c.	..	+½	..
75,940	"	Mar. 5	11	12	Oriental, Ltd.	..	..	..
300,000	Stk.	"	7/6	8⅜	Plym'th & Ston'house 5 p.c.	100—105	..	..
188,120	"	May 7	9	7	Portsea Island B	108—113	..	..
60,000	50	June 25	7½	7½	Do. C	96—99	..	..
100,000	50	Mar. 5	13	14	Primitiva Ord.	93—98	..	..
2,289,909	1	"	12	13	Do. 4 p.c. Red. Deb.	8/3—9/3	−/3	8/3—9/0
311,100	100	—	—	—	Do. 4 p.c. Red. Deb.	78—80	..	..
600,000	Stk.	June 2	4	4	Do. 4 p.c. Red. Deb. 1911	64—66	..	65½
820,335	"	Jan. 22	4	4	Do. B. Aires 4 p.c. Rd. Db.	63—65	..	..
321,670	"	June 25	4	4	Do. R'r P'te 4 p.c. Rd. Db.	63—65	..	..
150,000	10	"	4	4	San Paulo 6 p.c. Pref.	7½—8½	..	..
125,000	50	Mar. 19	6	4	Do. 5 p.c. Red. Deb.	42—45	..	..
270,000	10	July 1	5	6	Sheffield A	104—106*e*	..	..
419,968	Stk.	Mar. 19	5½	5	Do. B	104—106*e*	..	..
1,047,000	"	"	5½	5½	Do. C	104—106*e*	..	..
90,000	"	"	5½	5½	South African	7—9	..	..
6,609,895	Stk.	June 11	6	5½	South Met. Ord.	91½—93½	..	..
1,895,443	"	Feb 19	5	4	Do. 3 p.c. Deb.	57—60*	..	92—93
734,000	"	July 9	3	6½	Do. 4½ p.c. Red. Deb.	102½—104½	..	58—58½
91,500	"	Mar. 5	5½	3	South Shields Con.	135—136*d*	..	103
1,187,795	"	Mar. 5	8½	6½	South Suburban Ord. 5 p.c.	91—94	..	..
368,837	"	Feb. 19	6½	8	Do. 5 p.c. Deb.	95—98	..	92½
647,740	"	June 25	6½	6½	South'mpt'n Ord. 5 p.c. max.	80—83	..	93
121,275	"	May 7	5	5	Do. 4 p.c. Deb.	70—75	..	..
250,000	"	June 25	3	5	Swansea 7 p.c. Red. Pref.	102—104	..	..
200,000	"	Mar. 5	4	4	Do. 6½ p.c. Red. Deb.	100—102	..	..
120,000	"	June 25	7	7	Tottenham District A 5 p.c.	116—119	..	..
882,275	"	Feb. 19	6½	6½	Do. B 3½ p.c.	93—98	..	..
150,000	"	"	8	8	Do. 3½ p.c. *Pref.*	103—105	..	..
181,255	"	—	6½	6½	Do. 4 p.c. Deb.	76—79	..	..
258,251	"	June 11	—	—	Tynemouth Con. and New	74—76*d*	..	..
	"	Mar. 19	4	4	Uxbridge, Maidenhead, &	..	..	..
197,294			5	5	Wycombe 5 p.c.	95—100	..	..
88,330	"	Feb. 19	6½	6½	Do. 5 p.c. pref.	95—100	..	..
91,800	"	"	5	5	Do. 5 p.c. Maidenh'd	90—95	..	..
	"	"	—	6½	Wandsworth, Wimbledon, and Epsom—	..	..	..
30,000					Wandsworth A 5 p.c.	127—132*	..	..
855,636	"	July 9	9½	8½	Do. B 3½ p.c.	107—112*	..	..
392,955	"	"	7½	7	Do. C and New	93—95*	..	..
352,000	"	"	6/9/6	5/19/0	Wimbledon 5 p.c.	102—105*	..	..
98,000	"	"	7⅝	6½	Epsom 5 p.c.	109—112*	..	..
88,416	"	June 25	7⅝	7½	3 p.c. Deb.	55—58	..	58—58½
			3	3				

Quotations at:—*a*,—Bristol, *b*,—Liverpool, *c*,—Nottingham. *d*,—Newcastle. *e*,—Sheffield. * Ex. div.